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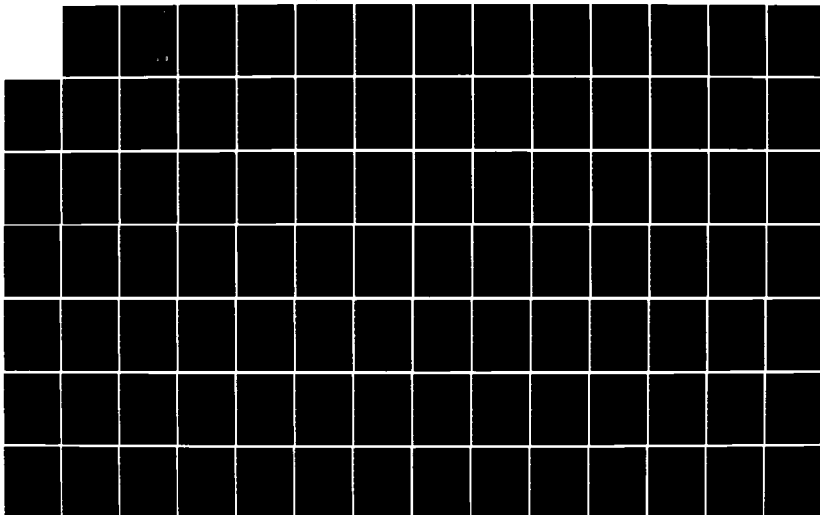
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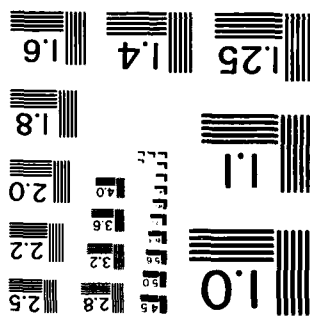
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INCREASING COMPETITION FOR SPARES WITHIN AFLC - PHASE III

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13 May 1984

Interim Report
Contract No. F33615-82-C-5095

Prepared for
AIR FORCE BUSINESS RESEARCH MANAGEMENT CENTER
Wright-Patterson AFB Ohio 45433

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<p>The research objective is to identify data problems which inhibit competition for spare parts within the Air Force Logistics Command. The ability to successfully breakout an item requires data and data rights to define the physical and functional attributes of parts, manufacturing techniques, and other information that permits a competent source to produce the item. Phase III updates the literature search and bibliography documented in Phase II and provides an evaluation of the thirteen hypotheses developed. It offers conclusions and recommendations in four major areas of inquiry: Data Rights, Data Management, Management Planning, and Economic Analysis.</p>			
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SUMMARY

This technical report describes the efforts accomplished by Analytics under Phase 3 of Contract F33615-82-C-5095. It covers the period 11 January to 15 April 1983 and conforms to the approach outlined in the Study Plan, Analytics Technical Memorandum 1808-TR-01, 30 September 1982 and Analytics Technical Report 1808-TR-02, 30 November 1982 (Revised 5 January 1983).

This report updates the literature search and bibliography, and provides an evaluation of the thirteen hypotheses developed during Phase 2. It concludes by offering conclusions and recommendations in four major areas of inquiry: Data Rights, Data Management, Management Planning, and Economic Analysis.

Chapter 5, Data Analysis and Findings, covers the evaluation of the thirteen hypotheses. The discussion of each hypothesis evaluation begins on a new page. This will enable the Air Force reviewers to separate the hypotheses into separate, stand-alone packages for distribution and review.

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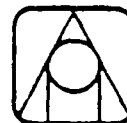
1. INTRODUCTION

This Technical Memorandum reports the results of Phase 3 of Analytics efforts under Contract F33615-82-C-5095 for the Air Force Business Research Management Center. It covers the period 11 January 1983 through 1 April 1983 and conforms to the research approach described in Analytics' Technical Memoranda 1808-TR-01, Increasing Spares Competition Within AFLC - Study Plan, and 1808-TR-02, Increasing Competition for Spares Within AFLC - Phase 2 Report.

The research reported in this memorandum was motivated by a perceived need to improve the ability of Air Force Logistics Command to obtain competition on the spare parts which are purchased to support fielded weapon systems. Since the research effort was initiated, there has been growing OSD, Air Force and Congressional interest in improvements in this area.¹ The level of Congressional interest is exemplified by a request to the Services and DLA to testify before the House Government Operations Committee on 14 April 1983 on the subject of Acquisition of Spare Parts.

This high level of interest is motivated by the fact that the cost of spare and repair parts represents a significant portion of the cost of supporting weapon systems within the Air Force (and DoD) inventory. This cost must be absorbed within a budget subject to many competing demands, and there is a consequent need to minimize the cost of spares acquired. There have been a number of studies which have consistently demonstrated that spares (and normally most other equipments and supplies) can be purchased at a lower cost to the government if there is a competitive market in existence. The capability of the

¹Office of the Deputy Secretary of Defense, Memorandum to the Secretaries of the Military Departments, Directors of the Defense Agencies, "Replenishment Parts Procurement," 15 March 1983.



Air Force Logistics Command to competitively procure spare parts is heavily dependent upon the actions taken during the initial system acquisition effort to obtain the rights to the technical data required to support competitive action and the possession of that technical data.

There are other benefits which accrue to the Air Force from having the capability to competitively procure spare parts. Federal law (10 USC 2304) and DoD policy require that, insofar as practicable, all contracts should be let on a competitive basis. This direction and basic good business reasons dictate DoD's desire not to be limited to just one source. Consequently, the Air Force would prefer to have at least two sources of supply for every part and subsystem it must buy.

A major method for achieving this objective is the item breakout process which is accomplished under AF Regulation 57-6, High Dollar Spare Parts Breakout Program. Through this program, the Air Force works with the initial provider of major items to identify those parts which can be bought on a separate basis and in accordance with the quantities estimated. This identification requires information or data and data rights to completely define the physical and functional attributes of the parts, manufacturing techniques and all other data that will permit the part to be provided by another competent source, with the same physical or functional characteristics as that made by the original source. The basic steps to accomplish item breakout are:

- a. Air Force satisfaction with the initial end item and the parts making up the end item.
- b. Identification of those parts that will be needed as spare and repair parts during the life of the end item.
- c. Obtaining complete and accurate descriptive information on the parts identified as spare and repair parts.
- d. Identification of capable manufacturers to provide functionally and physically interchangeable parts.



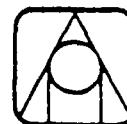
The process for identifying and selecting items for competitive spare parts procurement is accomplished within the framework of the initial acquisition program.

This process has been in effect since 1967, but has not been totally successful in maximizing the amount of competition for spare parts within AFLC. The focus of this research is on determining how well the procedures established within the Air Force have been applied through internal directives and in actual practice. The fundamental objective is the definition of system improvements and specific procedures which need to be established to achieve the improvements in life cycle cost which accrue from competitive spares procurement.

Since the eventual capability of AFLC to accomplish competitive spares acquisition is determined early in the acquisition cycle, it was necessary to look at the full spectrum of actions required during the life of a weapon system. Success in achieving competitive spares acquisition results from completing the following set of actions during the system life cycle:

1. Identify the specific data required.
2. Obtain the rights for use of the necessary data.
3. Establish contractual requirement for delivery of data (with appropriate rights).
4. Evaluate acceptability of submitted data.
5. File data in retrievable format.
6. Use data to contract competitively where it makes sense economically and technically to do so.

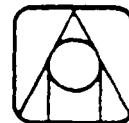
Each of these actions must be effectively accomplished on the items provided by the prime contractor for the weapon system and by the subcontractors and vendors. Our research attempts to look at the policy and procedure for each of these actions (as well as corollary



actions) and the implementation of those policies and procedures. Where measurable results exist, we focused on evaluating the degree to which the objective of competitive acquisition of spare parts is in fact, being achieved. These efforts then serve as a basis for making recommendations for changes in policies, procedures, or execution which can result in improvement in the level of competitive spare parts acquisition.

Achieving these improvements for AFLC requires that two separate issues be addressed. The first issue involves definition of systemic changes required in the acquisition process to effect a long term solution for the causes of the problem. The second issue is the identification of near term actions which can be taken to improve the competition posture of AFLC on systems which have been or are about to be transitioned. These improvements are necessary to respond to the language of 10 US Code 2304 which states:

"The Secretary of defense is hereby directed that insofar as practicable, all contracts shall be formally advertised and awarded on a competitive bid basis to the lowest responsible bidders."



2. LITERATURE REVIEW

2.1 INTRODUCTION

During Phase 2 and 3 of this research effort, we reviewed a wide range of literature on competition and the related issues of policy, legal aspects, data and rights to data, contracting practices, and studies and audits conducted to assess the execution of competition objectives.

The literature search included screening the assets of the Defense Technical Information Center (DTIC), the Defense Logistics Studies Information Exchange (DLSIE), and the Library of the Defense Systems Management College. From the large volume of literature reviewed, we have included a Selected Bibliography of the more relevant references in Appendix C. An Annotated Bibliography describing the references has been prepared as a separate volume (Analytics' Technical Report 1808-TR-03). The Annotated Bibliography includes a summary of each document cited. A list of the most relevant DoD Publications, Regulations, Manuals, Pamphlets, Military Specifications and Standards, and AFALD Lessons Learned is shown in Appendix D.

To establish a perspective, we also reviewed reports and statistics on the Air Force's current competitive posture. These included:

1. Semi-Annual Report, Spare Parts Procurement Reporting System (DD-I&L(Q)714), 16 August 1982.
2. Monthly 57-6 Report, PMC/AMOP Mismatch Report (AFLC Form J041-4TK-M2-M20), 31 January 1983.
3. Quarterly IMSS-11*, Procurement Method/Procurement Method Suffix Codes (RCS: DLA(Q)1739-11(S)). From this report we prepared a PMC Suffix Code Distribution (%) Sheet for the Air Force and for each Air Logistics Center, 31 December 1982.

*IMSS is the abbreviation of a DLSC Automated System (Integrated Materiel Support System) and has no significance except as a product identifier.



Finally, we reviewed the final draft of Air Force Regulation 800-34, Acquisition Management-Engineering Data Acquisition, which was published 11 April 1983.

2.2 COMPETITION THEORY

The degree of competition in a given market can be measured on a continuous scale ranging from pure competition to monopoly. In pure competition, the forces of supply and demand, not the actions of buyers and sellers, determine prices. At the other end of the scale, under monopoly, one seller controls the supply of a commodity and can regulate output, prices, and market conditions most favorable to him.

Between these extremes, the competitive area can be called imperfect competition in which the market is characterized by either few sellers or many sellers. With few sellers (like the automobile and steel industries) an oligopoly is said to exist. Where many sellers produce many products, the products are differentiated to some degree. Sellers spend a great deal of money and effort to persuade buyers that their products are indeed different.

In government purchasing, we encounter the complete range of market conditions. From almost pure competition in buying common, off-the-shelf consumable base supplies to almost complete monopoly in purchasing utilities and telephone services. In between, we encounter thousands of small suppliers of goods and services as well as the relatively few large defense contractors which display oligopolistic features.



From the buyer's standpoint, the existence of competition is a key to good pricing. Most producers do not have identical real costs of production. But even if their costs are the same, their competitive positions can be different. Ultimately, a seller must make a profit to survive, but each product in his line doesn't have to make a profit, and all accounts don't have to yield the same profit margin. When faced with competition, the price quoted by any specific supplier is governed by its need for business and by what it thinks its competitors will quote or bid.

2.3 COMPETITION: ITS ROLE IN SOCIETY

The original settlers were motivated to leave their homelands and brave an uncertain and hostile environment by a desire to establish a society free from oppressive economic, political, and religious regulation and control. From the beginning, individualism, self-reliance, and survival of the fittest have been keystones of our society. While it is true that certain monopolistic and oligopolistic structures have developed because of scale, complexity, or capital requirements, the United States is still basically committed to competition in economic and other aspects of life.

Our basic capitalistic system is reflected in the activities of the stock and commodity exchanges, which represent an almost perfectly competitive market. Most of our radio, television, newspaper and magazine revenues are provided by advertising. Even where competition is lacking (as in the regulated utilities), there is ever-increasing public scrutiny to prevent abuses.

2.4 THE CONGRESSIONAL MANDATE

From the beginnings of United States history, Congress has shown a strong interest in the use of competitive procurement to obtain lower prices and to prevent procurement abuses. The Procurement Act of 1809 established a general requirement that formal advertising be used in the procurement of supplies and services for the government of the



United States. Competitive bidding (formal advertising) served the federal government effectively for over 100 years, but increasing technological complexity and greatly increased volume of purchases led to widespread substitution of negotiated purchasing by the beginnings of World War II.

After World War II, Congress passed the Armed Forces Procurement Act of 1947, which formally recognized that negotiated procurement is a required method of purchasing in peacetime as well as wartime in certain cases. The Act permits purchases to be negotiated when certain conditions or "exceptions" (17 in number) exist. The Act states that all procurement will be made by formal advertising unless one of the 17 exceptions permits negotiation. The most often used exception is Exception 10: "Supplies or services impractical to secure by formal advertising."

Long-standing concern over the process of acquiring major systems led to the issuance of OMB Circular No. A-109, "Major System Acquisitions," 5 April 1976, currently under revision, addressed to the Heads of Executive Departments and Establishments. The Circular established management objectives, one of which is to tailor an acquisition strategy for each program, including, "Methods for obtaining and sustaining competition."

There has also been continuous and increasing pressure from Congress, Congressional Committees, and the General Accounting Office to increase competition for repair parts, supplies, and services as well as Major Weapons Acquisitions.

2.5 COMPETITION: ITS ROLE IN THE DOD

The requirement for achieving maximum competition in DoD purchases has always been a basic legal and procedural requirement of the Defense Acquisition Regulation (formerly Armed Services Procurement Regulation).



A combination of high costs, increasing technical complexity, and relatively few prime system contractors led to several problems in the acquisition of major weapon systems, as addressed in OMB Circular A-109. Efforts to improve the effectiveness of the management of major system acquisitions were reflected in Deputy Secretary of Defense Frank C. Carlucci's Memorandum for Secretaries of the Military Departments, subject: "Improving the Acquisition Process," 30 April 1981. This Memorandum contains 32 initiatives, the last of which was to, "Increase Competition in Acquisition by Establishing Management Programs and Setting Objectives." This was reinforced by Mr. Carlucci in a Memorandum for Secretaries of the Military Departments, subject: "Increasing Competition in the Acquisition Process," 27 July 1981.

On 10 November 1981, the Undersecretary of Defense for Research and Engineering sent a Memorandum To Secretaries of the Military Departments, subject: "Increasing Competition in the Acquisition Process." Among other provisions, the Memorandum directed the Secretaries to:

- Designate advocates for competition at each procuring activity who are responsible for ensuring that competition opportunities are not lost.
- Establish realistic but challenging competition goals.

On 29 March 1982, DoD Directive 5000.1, "Major System Acquisitions," was reissued to reflect the Acquisition Improvement Program and to implement the concepts and provisions of OMB Circular A-109. DoD Instruction 5000.2, "Major System Acquisition Procedures," was reissued on 8 March 1983. Other DoD Directives and Instructions and Sections which flow from DoD Directive 5000.1 are under revision accordingly.

More recently, the Secretary of Defense sent a Memorandum to the Secretaries of the Military Departments, the Chairman of the Joint Chiefs of Staff, and other DoD activities, subject: "Competitive Procurement," 9 September 1982. This Memorandum emphasized that the benefits derived from competition include cost reduction, quality



improvement, and enhancement of the industrial base. It also states that, "No type of purchase is automatically excluded from this direction to maximize competition and this direction applies regardless of the level of the requesting official or the importance of the subject matter of the contract."

In response, the Under Secretary of Defense (Research and Engineering) sent a Memorandum to the Assistant Secretary of Defense (MRA and L), the Assistant Secretaries of the Services, and the Director of the Defense Logistics Agency, subject: "Competitive Procurement of Spare Parts," 19 October 1982. This Memorandum established the Defense Procurement/Data Steering Group to "study the critical issues, to examine present policies, procedures, and resource allocations." The Group will, "Recommend measures to improve our procurement of spare parts and to restructure our acquisition and use of data."

On 15 March 1983, the Deputy Secretary of Defense sent a Memorandum To The Secretaries of the Military Departments and Directors of the Defense Agencies, subject: "Replenishment Parts Procurement." This Memorandum places emphasis on the DoD High Dollar Spare Parts Breakout Program to obtain more competition in federal procurement. It also points out that the principal factors that inhibit breakout are:

- 1) the lack of adequate technical data to support reprocurement from other than existing sources, and,
- 2) less than full commitment of necessary technical support.

2.6 REGULATORY GUIDANCE

The above Memoranda explicitly recognize the relationship between competitive procurement of spare parts and the acquisition and use of reprocurement data. The relationship among the more relevant Military Specifications, Military Standards, Air Force Regulations and Pamphlets dealing with the acquisition and use of data is described below.



MIL-STD-490, "Specification Practices," 30 October 1968, establishes the format and content of system specifications, which, together with drawings, form the basis for a Technical Data Package (TDP) which can be used for competitive procurement. Type C Product Specifications are defined as specifications used in the production of a prime item of equipment and are essentially sufficient to serve as a TDP. Specifically, Type C1b, Prime Item Product Fabrication Specification contains all the information needed for competitive reprocurement when combined with the correct engineering drawings and associated lists.

DoD-D-10008, "Drawings, Engineering and Associated Lists," 31 October 1980, is the specification which defines different levels of drawings progressing from system inception to production. Level 3 drawings provide engineering data for quantity production of an end item of equipment and for competitive reprocurement of spare parts substantially identical to the original items. If Level 3 drawings and associated data are specified in the contract and delivered with acceptable quality and unrestricted rights, the Air Force should have sufficient data to reprocure competitively.

MIL-STD-1388-1 and MIL-STD-1388-2, "Logistic Support Analysis," 15 October 1973, establish criteria for the development of a Logistic Support Analysis (LSA), as part of the engineering process, to define system support requirements and to inject support criteria into system/equipment design and acquisition. The LSA is intended to be the integrating document for the processes of provisioning spare parts, Procurement Method Coding, and data acquisition.

Air Force Regulation 57-6, "High Dollar Spare Parts Breakout Program," March 1969, is a Joint Regulation establishing, for the Department of Defense, uniform policies and procedures relating specifically to procurement of spares and repair parts for use in the maintenance, overhaul, and repair of equipment and systems. The process is described below in general terms.



During the provisioning process, decisions are made reflecting the Maintenance Concept, including what spare parts will be specified, and what spare parts new to the inventory must be identified and purchased to meet initial support requirements. After identification of what spare parts are required for the Maintenance Concept, decisions also must be made as to how they will be procured in terms of competitive posture. The intent of the High Value Spare Parts Breakout Program is to identify those high dollar spare parts which offer the greatest potential savings through competitive procurement or "breakout." High Dollar Value Replenishment Spare Parts are defined as, "spare parts included in those items ranked in descending order of annual buy value (computed by multiplying the unit price times the annual buy quantity) which represent at least eighty percent (80%) of all dollars expected to be spent in the 12-month period when measured in descending order from the highest annual buy value item."

Usually, the contractor is asked (required by the contract) to recommend the method of procurement through the use of numeric Contractor Recommended Codes (CRC) and Suffix Codes to indicate the basis for the assignment of the numeric code. Upon concurrence by the Air Force, each screened item is assigned a Procurement Method Code (PMC) and PMC Suffix Code. The PMC will determine how the item will be purchased unless the PMC is changed by subsequent review. These codes are defined in Appendix A.

In the regulation, methods are presented for computing expected savings from breakout as part of the full screening decision process.

AFLC/AFSC Supplement 1 to AFR 57-6, 12 October 1976, requires that AFLC activities will establish an AFR 57-6 Program Manager.

Air Force Regulation 310-1, "Management of Contractor Data," reissued 8 March 1983, sets procedures for managing the acquisition of data from the contractors under the terms of Air Force contracts. It states Air Force policies for managing the acquisition of data from contractors and defines management responsibility for the generation and control of data requirements, and subsequent data acquisition, distribution, and use.



AFLC/AFSC Pamphlet 800-34, "Acquisition Logistics Management," 12 August 1981, is a basic reference book for acquisition logistics matters within AFLC and AFSC. It primarily helps the program manager (PM) and the Integrated Logistics Support Office (ILSO) identify, schedule, and accomplish or cause to be accomplished the key logistics tasks needed for the logistics support of acquisition programs. It also has guidance which will aid the other organizations within the program office and AFLC/AFSC field units in understanding the role of the ILSO as well as their roles and interfaces relative to the ILSO's functions and responsibilities.

Chapter 25, Engineering Data, is an excellent presentation of how to acquire adequate, accurate, and complete engineering data needed for the government's use in maintenance, engineering, modification, reprocurement, and other support data. Being a pamphlet, its only shortcoming was that it did not have the force of a regulation. This will soon be overcome by Air Force Regulation 800-34, "Engineering Data Acquisition," 11 April 1983. Among other provisions, this new regulation requires that the program manager ensure that the procuring contract officer (PCO) includes the "Predetermination of Rights in Technical Data" clause (DAR 7-2003.61) in solicitations and the "Notice of Certain Limited Rights" clause (DAR 7-104.9(b)) in both solicitations and contracts. These clauses require the contractor to notify the PCO when the contractor or any subcontractor, vendor, or supplier to the contractor intends to use any item having data subject to limited rights. It also requires that claims of data subject to limited rights be resolved promptly, and if necessary, rights be acquired while competition still exists among alternative contractors.

2.7 CONCLUSIONS

Summaries of cited references are included in the Annotated Bibliography and will not be repeated here. The same general themes pervade the literature from all sources and conclusions are summarized here.



Increased competition is a national policy and objective as espoused by the President, the Secretary of Defense, and Congress. The objective is multi-dimensional, including considerations of price, quality, industrial base, and socio-economic programs.

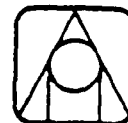
The ability to reprocore spares competitively after transition of a system from AFSC to AFLC is determined early in the system acquisition process, and is a function of the specific contract clauses and terms included in system acquisition contracts and aggressive action to manage the acquisition of data.

Despite the general agreement that competitive reprocorement is beneficial, the realities of relative priorities, funds constraints, personnel motivational factors, and legal problems often prevent the front-end actions being taken to permit successful reprocorement during the Operation and Support Phase of systems acquisition.

Even when there are the best intentions on everyone's part, there is a certain amount of ambiguity or confusion in several areas, including:

- a. Policy, regulations, and procedures.
- b. Specific responsibility and accountability.
- c. Inconsistency in definitions and terms relating to data among equally authoritative publications.
- d. Application of appropriate DAR clauses and subsequent resolution of disputes.
- e. Procedures for acquiring missing or inadequate data by the ALCs long after the original contracts have terminated.

GAO, DAS, and AFAA studies and audits are generally critical of competitive posture and breakout efforts, but generally do not attack the problem at the front end, where the seeds are sown for downstream problems.



3. INTERVIEWS

3.1 SCOPE

During Phases 2 and 3, we conducted interviews with key personnel involved with acquisition management policy, the breakout process, management and use of technical and reprocurment data. A list of persons interviewed is shown in Appendix E.

In order to achieve interactive dialog and conserve TDY funds, we interviewed personnel of the Air Logistics Centers (ALCs) using the Air Force Institute of Technology's Teleteach System. The Teleteach Agenda Topics are shown in Appendix F. Special emphasis was given to the specific questions in Paragraph 9, Appendix F.

We also conducted interviews with Air Staff personnel (LEYE and RDCL). A protocol for these interviews is shown in Appendix G.

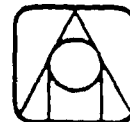
During Phase 3, as part of the data collection plan, we interviewed personnel at ASD, ALD, AFLC, Warner Robins ALC, and Ogden ALC. Significant comments and findings will be included in the discussions of specific hypotheses.

3.2 SUMMARY

To avoid repetition and to provide nonattribution to specific persons, the principal comments obtained during the interviews are summarized below. With few exceptions the comments were consistent and mutually supportive and were consistent with the conclusions drawn from the literature search.

3.2.1 Policy and Management Planning

Although there are a variety of Directives, Regulations, Pamphlets, and Defense Acquisition Regulations, etc., there is no single vehicle which ties the whole data management process together throughout the acquisition process, nor one that makes it a closed loop



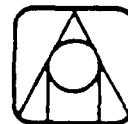
process. Decisions on what data to buy, the specific requirements in terms of contract clauses, and other decisions which will ultimately affect reprocurement or breakout are made early in the acquisition process. At this point in the process, requirements may not be fully known, ALC participation may be limited, and, when there are funding constraints, data may be considered a "soft" area, subject to cuts.

The ALCs have to live with downstream consequences of early decisions; therefore there is general agreement that the ALCs should be involved as early as possible in all phases of the process -- contract data requirements, provisioning, and the Procurement Method Coding (PMC) process. In order to accomplish this, there is a requirement for early identification of the supporting ALC, the availability of quantitative and qualitative resources, including adequate TDY funds for meetings and conferences, and strong support by management.

All persons interviewed expressed confidence that the new Air Force Regulation 800-34, "Acquisition Management-Engineering Data Management," will go a long way toward improving the whole data management process for the following reasons:

- It is a joint AFSC/AFLC regulation, stating what both have agreed to do.
- It is an 800 series regulation, so there is no question that it involves acquisition management.
- If an argument arises about the role, importance or responsibilities of logistics and data management, logistics personnel will have a joint 800 series regulation to hold forth.

However, it is recognized that the effects of AFR 800-34 will not really be felt for several years.



3.2.2 Data Management

Our interviews were unable to find any audit trail to review provisioning decisions, CRC/PMC decisions, or questions involving rights in data which become in issue when the ALCs encounter problems in break-out or reprourement. Contracts may have been completed and retired to archives, and PMC and provisioning decisions are not documented or available. If a drawing is marked "Restricted," there is usually no basis downstream to challenge it.

Definition and terminology are also data management problems. There is confusion between the "Form and Category" system used in MIL-D-1000 (1965) and the system which replaced it with the "Level" system of DoD-D-1000B (1977), (see Appendix K for definitions). Often, the contract or amendments to the contract contain mixed requirements, in which the Statement of Work may call for preparation of drawings and associated tasks to a "Level 3," while the Contract Data Requirements List calls for a "Form and Category," either directly or by citing an obsolete Data Item Description. It is generally agreed that we should buy Level 3 data which, by definition, is "to provide engineering data for support of quantity production of the end product to permit competitive procurement for items substantially identical to original items." These data, together with other related documentation should meet government needs, including competitive reprourement.

Under the previous "Category" system, data was often ordered by and for logistics support (Category D), procurement (Category E), maintenance (Category H), etc. When deferred ordering of data was specified, these data (in some cases identical) could well be ordered, delivered, and paid for more than once. "Level 3" data, should fit the needs of all users and be available for the cost of reproduction and administrative processing. When deferred ordering of data is not specified, it is often difficult to identify the cost paid. Often the cost of data is buried in the overall contract costs. As additional evidence of the potential confusion among knowledgeable data personnel,



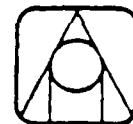
Sacramento ALC recently sent a letter to AFALD asking for a definition of Level 3 data. It appears that ambiguities in definitions and terminology contribute to the general problem of data management.

3.2.3 Rights in Data

Interviews confirmed that PMC Suffix Codes C, D, H, and P predominate. These served as a basis for further study in Phase 3. The current DAR contract clauses, especially, "Predetermination of Rights in Technical Data," (DAR 7-2003.61) and, "Notice of Certain Limited Rights," (DAR 7-104.9(b)) are adequate to cover rights in data if used correctly and consistently. But it seems difficult to translate perceived requirements into contract terms which produce the desired results. There are some 14 different DAR clauses addressing rights in data. Appropriate clauses may be included in contracts early in the acquisition process. By the time the ALCs want to break out parts for reprourement downstream, the system has been transferred from AFSC to AFLC, and records, contracts, and other historical data may not be available and an audit trail is virtually non-existent. If a drawing is marked "Restricted," there is often no basis for successful challenge. JAGs will normally not pursue a challenge unless there is a clear case, which generally is not so.

In one case cited, the JAG stated that, if an ALC goes back to a prime contractor for missing data, the ALC must state that it is being requested for reprourement purposes. The response from the prime contractor is usually negative.

Again, the whole issue of rights in data and criteria for the technical acceptance of data must be established during the acquisition process. The problem has to be attacked early. It has to be solved sooner or later -- and the later it is addressed, the more difficult and more expensive is the solution.



3.2.4 Economic Analysis

A part of the breakout process in AFR 57-6 and generally accepted management principles require that the expected benefits of competitive reprocurement be weighed against the cost to develop a second (or multiple) source.

Studies¹ have shown that the cost of developing new sources, including time and expense of first article development and testing, is often understated.

There does not appear to be an agreed-upon, uniform procedure to calculate savings derived from breakout. Some inconsistencies are:

- Comparing new unit costs to buys which were made several years ago, without taking inflation into account.
- Ignoring the effects of small volume purchases or priority buys.
- Comparing new unit costs to standard prices instead of contract costs.
- Applying savings on one buy versus a series of buys.
- Disregarding administrative and technical costs to establish new sources.
- Ignoring post-award activity costs, including termination costs.

ALC personnel involved in the breakout process suggested that, with current pressures to improve competition, they break out whatever they can, without regard to economics. Others said that many items which were not seriously considered for breakout, have suddenly become attractive with inflationary pressures.

In any case, there was no evidence that breakout is subject to uniform and valid economic analysis.

¹Department of the Air Force, Component Breakout in Weapon Systems, Acquisition, Washington, D.C.: Air Force Audit Agency (SRA807510), 17 December 1980, (for example).



3.2.5 USAF Engineering Data Support Center (AFALD/PTD)

During our interviews, the Engineering Data Support Center, often referred to as, "the Repository," was a subject of discussion. During our visit to the Repository, the following facts were obtained:

- The Repository is primarily a receipt, storage, and issue point for engineering drawings, not only for the ALCs, but for other Services, Foreign Military Sales, DLA, and other customers.
- By mission and manning, the Repository has no capability for assessment of technical adequacy or completeness of data. Data is stored in drawing number sequence and each drawing is filed as it is received.
- Currently, all operations are manual, with no capability for automated retrieval.
- There is a program underway to automate the indexing of on-hand data (effective August 1983), but efforts to automate retrieval are a long way off.
- If the Repository is furnished a Pre-Delivery Data Requirements List, this list could serve as a due-in asset file, but will not assure that all required data is actually received.
- The Repository furnishes reproducible drawings (aperture cards) to the appropriate ALC "automatically" (if a series of manual, procedure-based actions is taken).
- The whole process is an open-loop, people-dependent system. This observation is not meant to be critical of the Repository Commander or staff -- it is the way the Repository is staffed, organized, and equipped.



4. METHODOLOGY

4.1 INTRODUCTION

Our focus on this research is to identify those impediments to competitive spares acquisition which have major impact on the attained level of spares competition. During Phase 2, data from the IMSS-11 Procurement Method/Procurement Method Suffix Code Report, RCS: DLA(Q)-1739-11(S) was evaluated to determine the primary reasons (as reflected in PMC Suffix Codes) for the noncompetitive acquisitions. This report showed a significant amount of spares being purchased directly from the actual manufacturer, thus avoiding the administrative cost of going through the system prime contractor, but that competitive spare acquisition remains at a relatively low percentage. During the process of interviews in Phase 2, the interviewees suggested that data and data rights were the primary impediments to increasing competition. This conclusion was supported by the IMSS-11 report. Review of this document indicated that the largest categories of noncompetitive purchase were in four suffix codes. These dominant suffix codes are:

- C Procurement from approved source
- D The data not available
- H Inadequate data
- P Rights to use data legally not available

Three of these suffix codes, D, H, and P, directly reflect data or data rights issues. The other suffix code, Code C, often reflects an inability to adequately describe the item. Control of the quality of delivered items requires specific approval of the source by the agency having design control. This control is an contrast to the more typical situation of controlling quality through the medium of conformance to drawings and other technical data. When we are unable to give a technical description of the part and the manufacturing processes, control of the source of manufacture is a viable alternative.



When one examines the pattern of the suffix codes at each of the ALCs, this pattern is again seen. The pattern of suffix codes which represented more than 5% of the coded items at the ALCs, showed that they tend to be primarily in Suffix Codes D, H, and P. Since our research is focused on methods of removing impediments to the process of breakout to competition, our Phase 3 efforts were directed to those areas which appear to be impeding successful breakout.

The interviews and literature survey of Phase 2 also suggested that there are two separate issues which need to be addressed. The first issue involves systemic changes required in the acquisition process to effect a long term solution for the causes of the problem. The second issue is the identification of near term actions which can be taken to improve the competitive posture of AFLC on systems which have been or are about to be transitioned.

In structuring the specific hypotheses for investigation, we were guided by three assumptions:

1. The objective of the research effort is to develop useful recommendations for changes to policies and procedures that can be described within an economic framework.
2. Where previous studies have demonstrated the existence of a specific problem, we will not replicate that research.
3. The data gathered should support both of the problem issues noted above.

The Phase 3 research effort was directed towards four major areas of inquiry: Data Management, Data Rights, Management Planning and Economic Analysis. The effort was structured toward thirteen research hypotheses, which are shown in Figure 4-1. Research on these hypotheses was accomplished as described below.



DATA MANAGEMENT

- H1: There is a pattern in the types of information which are unavailable in data packages.
- H2: Sufficient data is available in ALC files to support the decision for noncompetitive coding.
- H3: The personnel in the SPOs understand their responsibility for determining usability of technical data and have established procedures for accomplishing the responsibility.
- H4: Clear acceptance guidelines exist for the determination of the usability of technical data being acquired for competitive spare parts acquisition.

DATA RIGHTS

- H5: Current contracts contain required data clauses for submission of data appropriate for competitive procurement of spares.
- H6: The process for challenging restrictive markings on data is well understood by ALC personnel.

MANAGEMENT PLANNING

- H7: Criteria exist for the early definition of data requirements for competitive acquisition of spare parts.
- H8: The qualitative and quantitative resources to support the requirements of AFR 800-34 at the ALCs can be identified.
- H9: PMC files show interaction with the provisioning process.
- H10: Improvements could result from establishing a connection between Logistics Support Analysis and the Procurement Method Coding processes.

ECONOMIC ANALYSIS

- H11: System prime contracts show the price paid for technical data necessary for competitive spares procurement.
- H12: Data exists which shows the cost of correcting an incomplete or illegible data package by the ALC.
- H13: There is auditable data which shows the savings attainable by competitive spares procurement.

FIGURE 4-1 Phase 3 Research Hypotheses

4.2 DATA BASE

The population of interest for this study effort is a subset of those items which are managed under the provisions of AFR 57-6 with the Air Force Logistics Command. These items represent a potential for reduced support cost when they can be acquired in a competitive as opposed to a sole source environment. The particular subset of interest is those items which are currently coded for noncompetitive acquisition, excluding those which are coded with PMC Suffix Code L (the low dollar value of procurements makes it uneconomical to improve the procurement status of this item). Since our research is intended to evaluate competitive spares acquisition procedures from the standpoint of economic benefit, items which are Suffix Code L should be excluded. Thus, our population of interest represents those items which are:

- a) Currently coded for noncompetitive procurement (see Appendix A).
- b) Purchased in quantities whose annual buy value offers potential savings to offset the cost (currently undefined) to break the item out for competitive purchase.

The approach originally contemplated for focusing our research was based on detailed evaluation of two weapon systems. As a result of the Phase 2 effort, the systems chosen were the F-15 aircraft and the Maverick Missile. Our preliminary visits to the two ALCs involved, Ogden and Warner Robins, brought to light two problems with that approach. The two weapon systems are assigned for system management to these ALCS, but many of the support items are managed and purchased by organizations other than the ALC with weapon system management responsibility. This can be seen for the F-15 by reference to Figure 4-2. While Warner Robins ALC is the F-15 System Manager, only 4.1% of the F-15 items are managed there. Thus, the population of F-15 items available for study at Warner Robins ALC is relatively small. This situation also holds for the Maverick Missile System at Ogden ALC. The second problem which arose at both locations involved data availability. Even though the two systems were following



ITEMS MANAGED

<u>Service</u>	<u>Center</u>	<u>SOS</u>	<u>#Items</u>	<u>%</u>
USAF	SM-ALC	FFZ	10,676	9.9
	OO-ALC	FGZ	1,353	1.3
	OC-ALC	FHZ	4,331	4.0
	WR-ALC	FLZ	4,360	4.1
	SA-ALC	FPZ	15,832	14.7
	AGMC		0	0
		USAF TOTAL	<u>36,552</u>	<u>34.0</u>
DLA	DCSC	S9C	2,822	2.6
	DESC	S9E	39,350	36.6
	DGSC	S9G	4,235	3.9
	DISC	S9I	22,440	20.9
		DLA TOTAL	<u>68,847</u>	<u>64.0</u>
ARMY			219	.2
NAVY			699	.7
LOCAL MFG/COMMERCIAL			<u>1,098</u>	<u>1.0</u>
		TOTAL ALL AGENCIES	107,406	
		TOTAL ITEMS REPAIRED	1,029	

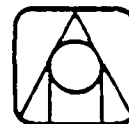
FIGURE 4-2 DISTRIBUTION OF F-15 ITEMS (excluding engine)

different data acquisition strategies, both were in the position of heavy reliance upon the respective prime contractors for data availability. As a consequence, little data would be available for review even on those items managed by the responsible ALC.

As a result of these situations, Analytics recommended by Contract Change Proposal, dated 7 March 1983 (issued for signature as Modification P00001 on 25 March 1983) that the research focus on the parts which are item managed by the two ALCs. These parts were the population from which the samples were drawn as described below.

In addition to the objective data found in the 57-6 files, we also identified a need to gather data through an interview process. This data would reflect training, perceptions, individual task assignments and elements of system and 57-6 program history which are not evident in the individual item files. The population for this research effort was somewhat more difficult to define. It included personnel from the following groups who were involved with the initial acquisition of systems or data, the AFR 57-6 breakout process, or policy influencing either of these areas.

- a. Air Staff
- b. AFLC Headquarters
- c. Aeronautical Systems Division (ASD)
- d. Various SPOs at ASD: F-15, F-16, Maverick, B-1, A-10, EF-111, Lantirn
- e. AF Acquisition Logistics Division
- f. Warner Robins and Ogden ALCs
 - 1) Directorate of Material Management
 - 2) Directorate of Contracting
 - 3) Judge Advocate General
- g. Defense Audit Service and Air Force Audit Agency



4.3 DATA COLLECTION PROCEDURES

There are two general types of data which were gathered in Phase 3. The first was objective data that was obtained from review of files at the individual ALCs and at the Engineering Data Support Center (EDSC). The second type of data tended toward the subjective and was gathered on an interview basis. Figure 4-3 was used to record applicable information from the AFR 57-6 files at the two ALCs visited. In each case, a sample of items (described in paragraph 4.4 below), was identified to the ALCs. Prior to arrival of the research team, personnel at the respective ALC Repositories pulled the appropriate files and supporting data packages and procurement histories from the J041 data system. These data sets were reviewed using the worksheets shown in Figures 4-3 and 4-4 to extract the information required for this project.

The data required to evaluate the issue of contract language was acquired by a review of a sample of contracts on file at the AFEDSC (sample selection is described in paragraph 4.4 below). The contract numbers were provided to EDSC personnel who pulled the appropriate file (if available). The contract file was reviewed using the worksheet shown in Figure 4-5, to determine the usage of the various clauses in past and current contracts.

The interview data was gathered by using the guided interview sheet appropriate for the interviewee's job assignment. The specific interview sheet was selected from those shown in Figures 4-6 through 4-9. In each case, the interviewees were assured of nonattribution of their remarks and the interview was accomplished. During the interview phase, it became obvious that the data being obtained from each individual covered only portions of the AFR 57-6 process. This outcome reflects the manner in which the requirements are distributed within the organizational structure. When interviewees responded to



DATA WORKSHEET

PMC: _____ Data Acquired under contract: _____ System: _____

Item Nomenclature: _____ NSN: _____

Estimated Annual Buy Value: _____

Last Three Buys	Date	AMOP	\$Value
1.			
2.			
3.			

Basis for noncompetitive coding:

Current impediments to competitive purchase:

Evidence of interaction with provisioning:

How complete is data package?

Can the currency of the data package be determined:

FIGURE 4-3 Data Worksheet: IM/SI File Review

DATA WORKSHEET (H12 and H13)

Item: _____ System: _____

NSN: _____

PMC: _____ AMOP: _____

Actions taken to reclassify item to less restrictive status:

Cost of reclassification actions:

Savings Reported:

Basis of savings computation:

FIGURE 4- 4 Data Worksheet - Hypotheses H12 and H13

[illegible]

FIGURE 4-5 Data Sheet for Contract Review

Person Interviewed:

Related Training:

Grade:

Position:

Experience -- Participated in:

- | | |
|--|---|
| <input type="checkbox"/> Data Call | <input type="checkbox"/> PMC Coding |
| <input type="checkbox"/> Data Requirements Review | <input type="checkbox"/> Provisioning |
| <input type="checkbox"/> Negotiation of Data Clauses | <input type="checkbox"/> Acceptance of Data |
| <input type="checkbox"/> Pricing of Data | <input type="checkbox"/> PCA |
| <input type="checkbox"/> PDR | <input type="checkbox"/> FCA |
| <input type="checkbox"/> CDR | <input type="checkbox"/> ECPs dealing with data |

Is data required from the system contractor(s) to support competitive procurement of spare parts?

What is the SPO responsibility in determining the adequacy of technical data for competitive spares procurement? Is there any authority cited for this position?

How is this responsibility discharged within the SPO?

- a. Procedures
- b. Practice

What do you see as the primary problem in discharging that responsibility?

FIGURE 4-6 Guided Interview Sheet - SPO

DATA WORKSHEET (H4 and H6)

Person Interviewed:

Position:

Organization:

Time in Position:

Describe functional responsibility of individual for spares procurement.

List Data/Engineering courses taken.

What basis is used for determining the usability of technical data for competitive procurement of spares?

What guidance documents are available to assist in the decision on the usability of data?

If data is not usable, what are the most common shortcomings?

If data contains restrictive rights markings which appear inappropriate, what is the process by which these restrictions may be challenged?

When past challenges have been unsuccessful, where has the process broken down and for what reasons? Can this be documented?

FIGURE 4-7 Data Worksheet - Hypotheses H4 and H6

Person Interviewed:

Data Courses Taken:

Position:

Organization:

Time in Position:

Describe functional responsibility of individual for spares procurement:

On what basis is the decision made to acquire data and data rights for specific items within a weapon system?

What information is required to make this decision?

Typically, at what point in the development process is this detail available?

How does the ALC get access to the required data?

What guidance documents are available to assist in making the decision?
How useful are they?

Would the data from the Logistics Support Analysis process provide improved ability to project data requirements?

FIGURE 4-8 Data Worksheet - Hypotheses H7 and H10

DATA WORKSHEET (H8)

Person Interviewed:

Relevant Training Courses:

Position:

Organization:

Time in Position:

Describe functional responsibility of individual for spares procurement:

The AFR 800-34, currently in the printing process, establishes a number of tasks. What are the quantitative and qualitative skills that will be necessary to accomplish the following set of tasks (drawn from AFR 800-34)?

- Participate in periodic reviews, audits, and inspection of contractor and subcontractor data to make sure they are technically accurate, adequate, and comply with contractual drawing preparation requirements.
- With the implementing command and AFALD/PTD, determine and contractually define engineering data to be acquired and make sure that the necessary SOW tasks, data requirements (CDRL), and ordering and technical assistance option provisions are included in each solicitation and contract.
- With the implementing command, accept or reject any contractor proposed changes, use of limited rights, deviations, or interpretation of data requirements and tasks.
- Assist the implementing command in planning for engineering data acquisition.
- Advise the implementing command of supporting and operating commands' engineering data needs, including level of data required.
- Specify the requirement for and participate in in-process reviews and audits.
- Identify the data item descriptions (DIDs) and delivery dates for engineering data.
- Review each engineering data recommendation made by the contractor during proposal or during the contract period, particularly the drawing deviations or differences outlined. Determine the acceptability of the contractor's methods, schedules, and planning information for engineering data acquisition management.

FIGURE 4-9 Data Worksheet - Hypothesis H8

FIGURE 4- 9 Data Worksheet - Hypothesis H8 (cont'd)

- Take part in development of engineering data checklists and procedures to accomplish in-process reviews of data preparation, updates, configuration audits, and acceptances.
- Provide qualified personnel to take part in each function of engineering data acquisition.

questions by citing that another person or organization was responsible for a particular area, we attempted to add that person or organization to our interview list. This approach should provide a sample of personnel with sufficient breadth to draw a well founded set of conclusions.

4.4 SAMPLE SELECTION PROCEDURES

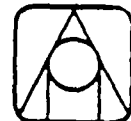
4.4.1 AFR 57-6 Files

For each ALC to be visited, it was decided to review a sample of fifty data packages. The sample size was chosen based on consideration of the cost of assembling the data package and the increased precision of conclusion which result from larger sample sizes. The cost of assembling each data package was estimated by Ogden ALC as 3.5 hours and by Warner Robins ALC as 2 hours. This difference was driven by the relatively greater number of drawings in file for the sample selected at Ogden ALC. The precision resulting from increasing sample size was estimated by considering the expected value of a 90% confidence interval around a sample proportion if the population proportion were assumed to be .25. Following Duncan,¹ a 90% confidence interval is given by adding to the sample mean quantity $1.65 \sqrt{\frac{p(1-p)}{N}}$, where p is the observed proportion in the sample and N is the sample size. Under the assumption that the proportion follows a binomial distribution, the expected value of p is the population parameter P'. If we take a nominal value of P' as .25, then we can calculate the width of the tolerance band as:

$$2 (1.65) \sqrt{\frac{(.25)(.75)}{N}}$$

Evaluating this expression for various values of N yields the chart in Figure 4-10. As can be noted from Figure 4-10, the relative decrease in the expected width (centered about the mean of the particular sample)

¹Duncan, Acheson J., Quality Control and Industrial Statistics, Chicago, IL: Richard D. Irwin, 1952 (p. 351).



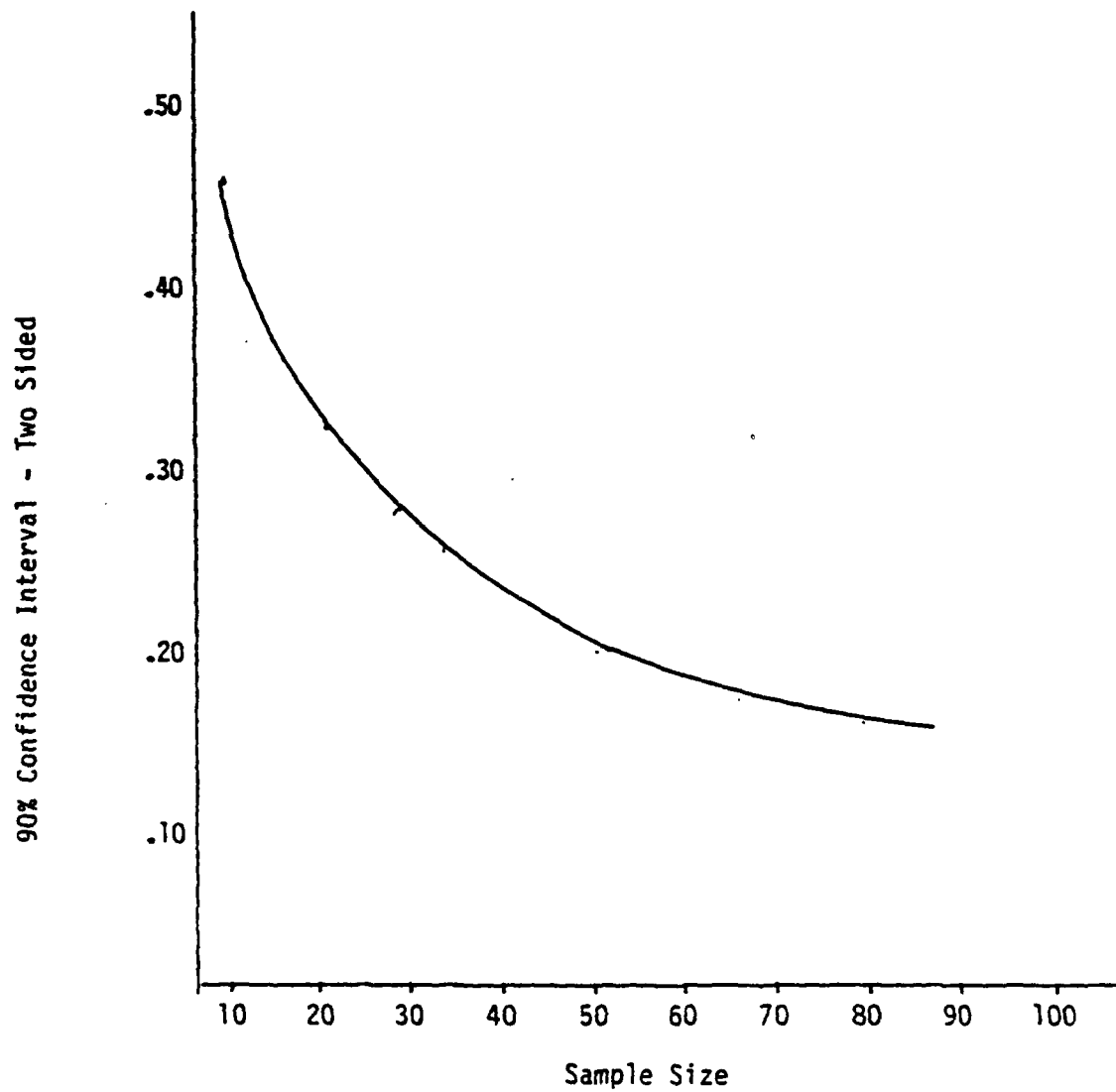
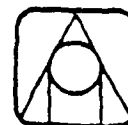


FIGURE 4-10 Confidence Intervals for Various Sample Sizes



of the confidence interval reduces as sample size grows. Given the cost of increasing sample size and the relatively minor gains in precision above $N=50$, this value for the sample size was selected. The specific National Stock Numbers (NSNs) to be included in each sample were randomly selected items coded with PMC Suffix Code D or H from Monthly 57-6 Report (A-J041-4TK-M2-M20) for the months of November, December 1982 and January 1983 (WRALC) and January 1983 (OOALC). Our intent was to use the January 1983 report as the source for all items since it reflected the most recent procurement activity. In the case of WRALC, it was necessary to extend our sampling to the two preceeding months to obtain the planned fifty items. The selected NSNs for each ALC are shown in Figure 4-11 and 4-12.

4.4.2 AFEDSC Contract Sample

The purpose of our review of the sample of contracts was to determine the usage of the various data clauses which are available. The sample size was decided at $N=50$ (see discussion in paragraph 4.4.1 on relationship between sample size and precision). Since a large number of items enter the AFLC inventory as a result of major aircraft acquisitions, it was decided that the sample should include the acquisition contracts for the F-15, F-16, Maverick, A-10 and B-1B. After identification of these contract numbers, the balance of the sample was randomly selected from the card catalog at the AFEDSC. These contract numbers were provided to EDSC personnel who made those files available to the researcher, if they could be located.

4.4.3 Interview Data

The selection of personnel to be interviewed was based initially on the organizations which have assigned responsibility for elements of the AFR 57-6 procedure or the acquisition or management of data to support the program. As the various organizations were contacted and personnel interviewed, other personnel were identified and added to the sample. The full list of personnel interviewed is shown in Appendix E.



<u>NSN</u>	<u>NSN</u>	<u>NSN</u>	<u>NSN</u>
16150105363938Z	5865004218533EW	1560010410545WF	1430009789982BF
1680007938523LG	5865010814052EW	1560010498777WF	5935010574289WF
5805010791711CX	5865010892837EW	1560010721237WF	5950004597855AH
5815011251685CX	5865010920000EW	1560010878962WF	5962010774289WF
5821001153546	5895003397006	1560011165688WF	5995010509141BF
5826010651759	5950010627414XZ	1560010901125WF	6105000430549AH
5841010944809GY	5962010877183EW	2915006063486BF	6105009670395AH
5865010505812EW	5962010977483EW	1270010694390WF	1560010410475WF
5865011206405EW	1270009533946	1270010702774WF	1560010721245WF
5865011237499EW	1270010149663	1270010774878WF	1560010778114WF
5895010967478	1280010952727	1270010794168WF	1560011213625WF
5905004215991CW	5821011081443	1620001134450	1270010835926WF
5985009492070EW	5831005358123	1620007569956	1270010880966WF
6105011055547YW	5985006268969EW	1620011309237	1270011021057WF
6625011252564EW	1560002349561TH	1630001670640	1280011074893WF
6625011263245EW	1270001388482	1630010054188	1620004035251
1270006747890	1280009741944	1630010528221	1620008945068
1280011067683	6605007265363JH	1650000738662BF	1630003101546
1280011215811	5821010067396	1680010512211WF	1630004795787
1280011215812	5831008803562	1680010522837WF	1630005534759
1280011233192	5841010262501	6610010748208WF	1630008347557
1280011233214	5865010458982EW	6615010598632BF	1630010516400
1280011295058	5831005391714	6680011323129BF	1630010824733
4920010610343GG	5831005391471	1430000657359BF	1660004208437BF
5841000738241	5831004341287	1430007754191BF	1680010536286WF
FIGURE 4-11 DATA SAMPLE - WRALC		FIGURE 4-12 DATA SAMPLE - OOALC	



4.5 STATISTICAL TECHNIQUES

4.5.1 AFR 57-6 Files

In evaluating this data, we can define a set of categories into which missing data can be defined. For the purposes of this research, we have established fourteen subordinate categories of unavailable data (see Figure 4-13). Define P_i as the proportion of cases which fall into category i ($i = 1, 2, \dots, 14$) and that each p_i can be described by a binomial distribution. We can establish an arbitrary value of p_i which we shall define as representing a significant proportion P_s . Any p_i which is greater than P_s indicates an area where corrective action could yield potential significant improvement. If we establish P_s as .25, we are interested in determining, through our sample data, which of the categories have a P_i exceeding P_s . If we consider each sample p_i as drawn from a binomial distribution with parameter P_i , and we are interested in $P_i \geq .25$, then we would accept the hypothesis for any category for which $p_i \geq .15$. This value is obtained by establishing a 90% confidence interval for p_i based on as assumed P_i of .25. If $P_i = .25$ and $N = 50$, then a 90% confidence interval can be calculated as described below.

Since N is large ($N = 50$) and $P > .10$, we can approximate the binomial distribution reasonably well by a normal distribution with mean equal to P and a standard deviation equal to $\sqrt{\frac{P(1-P)}{N}}$.² If we wish to establish a lower bound on the proportion which could have $P_i \geq P_s$, we can establish a 90% confidence limit for P_i as:

$$\begin{aligned} P_i - 1.65 \sqrt{\frac{P_i(1-P_i)}{N}} &\leq P \leq P_i + 1.65 \sqrt{\frac{P_i(1-P)}{N}} \\ .25 - 1.65 \sqrt{\frac{.25(.75)}{50}} &\leq P \leq .25 + 1.65 \sqrt{\frac{.25(.75)}{50}} \\ .25 - .10 &\leq P \leq .25 + .10 \\ .15 &\leq P \leq .35 \end{aligned}$$

²Duncan, Ibid



1. All data missing:
 - a. Not ordered or purchase deferred
 - b. PR or DD Form 1423 prepared
 - c. Ordered on ALC contract
 - d. Original delivery not yet due
 - e. Original contract closed - contractor won't furnish
2. Top drawing only available
3. Revisions not available
4. Data received:
 - a. Coded to other suffix code
 - b. Not yet rescreened
5. Process specifications missing
6. Tooling/Loft/Interface data missing
7. Test requirements missing
8. Random drawings missing
9. Other

FIGURE 4-13 Categories of Unavailable Data



Thus, we will consider that H1 is accepted for any category for which the observed proportion is greater than .15.

4.5.2 AFEDSC Contract Files

The analysis applied to this area of the research involved the enumeration of usage of the various clauses available in the Defense Acquisition Regulation for the acquisition of data and data rights. One objective was to display the usage frequency of the various clauses and determine the levels of difficulty encountered in extracting, from the contract file, the specific requirements concerning data.

4.5.3 Guided Interviews

The data obtained in guided interviews was not subjected to formal statistical testing. This data was used, in conjunction with information gathered in the literature search of previous studies (see Annotated Bibliography, Technical Report 1808-TR-03, previously delivered under this contract) to determine if the findings documented in these previous studies are still valid. As noted in the Study Plan (Analytics Technical Report 1808-TR-01) for this effort, we did not attempt to replicate the findings of these previous studies, but did use that information in developing our conclusions and recommendations.



5. DATA ANALYSIS AND FINDINGS

5.1 HYPOTHESIS H1

There is a pattern in the types of information which is unavailable in data packages.

5.1.1 Introduction

Phase 2 research had indicated that nonavailability of data was a major impediment to successful competition of spare parts. There are a large number of specific items of data which are required to competitively contract for a typical item. If there are patterns in the types of data which are missing in the individual AFR 57-6 files, then we can conclude that there are assignable causes for the problem and that focused corrective action can result in improvements.

5.1.2 Approach

Samples of 50 parts, identified by NSN, were selected at each of the ALCs to be visited as described in Section 4. The AFR 57-6 files and procurement histories for each NSN were made available by the ALC data Repository personnel for review by the Analytics team. These reviews were accomplished at Ogden ALC during the period 15 through 18 March 1983 and 29 through 31 March 1983 at Warner Robins ALC. The files were reviewed using the worksheets described in Paragraph 4.3. The review included evaluation of the AFLC Forms 761, the data lists prepared by the ALC personnel, the drawings and specifications available at the Repository and the procurement history for each item in the sample.

5.1.3 Findings

The results of the analysis of the AFR 57-6 data files is shown in Figure 5-1. Based on the statistical test described in Paragraph 4.5.1, it was determined that the hypothesis would be accepted for any category of data deficiency for which the observed proportion was greater than .15. Inspection of Figure 5-1, shows that H1 should be accepted for the following categories:



TYPE OF DATA DEFICIENCY	OOALC		WRALC	
	Count	Proportion	Count	Proportion
1. All data missing:				
a. Not ordered or purchase deferred			8	.16
b. PR or DD Form 1423 prepared	3	.06	6	.12
c. Ordered on ALC contract			1	.02
d. Original delivery not yet due	14	.28	9	.18
e. Original contract closed - contractor won't furnish	10	.2		
2. Top drawing only available			2	.04
3. Revisions not available	1	.02	2	.04
4. Data received:				
a. Coded to other suffix code	17	.34	8	.16
b. Not yet rescreened			1	.02
5. Process specifications missing	2	.04		
6. Tooling/Loft/Interface data missing	1	.02	3	.06
7. Test requirements missing	1	.02	1	.02
8. Random drawings missing	1	.02	4	.08
9. Other			5	.10
	50	1.0	50	1.0

FIGURE 5-1 DATA DEFICIENCIES - SAMPLE

	<u>Ogden ALC</u>	<u>Warner Robins ALC</u>
1a Not ordered or purchase deferred		X
1d Original delivery not yet due	X	X
1e Original contract closed - contractor won't furnish	X	
4a Coded to other suffix code	X	X

In pursuing discussions with ALC personnel, it was determined that category 1a at Warner Robins was very similar to category 1e at Ogden. Where Ogden ALC personnel determined that data had not been ordered (or were unable to determine whether it had been ordered), they would issue a form letter to the contractor requesting data for competitive reprourement. All ten examples of this in our sample resulted in a refusal by the contractor (usually a vendor to the original prime) to supply the requested data. Based on this finding, we feel that categories 1a and 1e reflect essentially the same condition that data is not available and there is no basis asserting and demonstrating the government's right to obtain it. Since the original contracts are closed, it is impossible to determine if:

- a. the Air Force had the right to receive the data,
- b. the data was ordered, or
- c. the data has been received at some point in time.

In looking at the items which fell in category 1d, (original delivery not yet due), we found that many of the items had been purchased a number of times covering a time period of up to five years. This would suggest that, at least in some cases, the scheduling of the delivery of the data may be later than is appropriate to achieve the full potential benefits of competitive acquisition.

The items falling in category 4a reflect those items which were coded with Suffix Code D or H in our sample (purchased November 1982 through January 1983) for which additional data was received which caused the suffix code to be changed. At Ogden ALC, three of the seventeen items



were changed to competitive PMCs, two to code 1C (Competitive - procure from approved sources) and one to code 1P (Competitive - rights to use data legally unavailable). The latter case reflected competition between the original manufacturer and a licensee.

The distribution of the other recoded items at Ogden ALC was:

<u>Number</u>	<u>PMC</u>	<u>Explanation</u>
5	3C	Procurement from approved source.
3	3M	Master or coordinated tooling required.
4	3P	Rights to use data legally unavailable.
1	3R	Rights to use data not available and uneconomical to acquire.
1	3V	High reliability part.

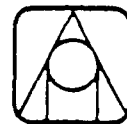
The parts recoded at Warner Robins ALC included only one recoded to a competitive Code 1C. The distribution of the other recoded items at Warner Robins ALC was:

<u>Number</u>	<u>PMC</u>	<u>Explanation</u>
2	3B	Source control.
1	3N	Requires special test equipment.
2	3P	Rights to use data legally unavailable.
2	3R	Rights to use data not available and uneconomical to acquire.

5.1.4 Implications

Availability of data and the rights to its use are critical in establishing a competitive acquisition environment for spares. The ALCs are greatly hampered in their task by shortages in the data available to them. In determining the completeness of a particular data package, there is generally no description of the data which is either:

- a. required to be delivered, or
- b. required to make a complete data package for a particular part.



Thus, when addressing the question of completeness, the ALC must take the top drawing, identify subordinate drawings and process specifications which are called out, obtain or order these other documents and review them to identify additional cited documents. The process is continued until no new documents are identified. This procedure suffers from two shortcomings:

1. It is relatively slow and labor intensive.
2. Even after completion, there is no assurance that the data package provides all the necessary data, only that it contains all the cited data.

The contracts under which data is to be supplied should uniformly include a requirement for the contractor to provide, prior to data delivery, a data list which identifies all the data to be contained in the Level 3 data packages to be delivered. (See DID DI-P-3472/P-126 for example.)

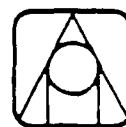
These data lists should then be used by the SPO and ALC to track contractor performance in submitting required data. The list may also serve useful purposes as part of the configuration management effort required within the ALC. At a minimum, these lists could save substantial time in identifying the data necessary to complete a partial data package.

It should be noted that MIL-STD-885B, Procurement Data Packages, requires data lists such as those described above. The Standard has been mandatory for use since 1971, but there is no evidence in the files reviewed that the data required by MIL-STD-885B is being received. The use and enforcement of this Standard should be emphasized within the acquisition community.

The large number of items in 3c, original delivery not yet due, coupled with procurement histories showing up to five years of purchases, suggests that data is often acquired later than the date of maximum impact on the competitive level of spares acquisition. The delivery date is normally a trade-off reflecting design instability, cost of data and



AFLC need. It is recommended that, to the extent practical, acquisition contracts require that Level 3 data be delivered at a point relatively early in the first production contract.



5.2 HYPOTHESIS H2

Sufficient data is available in ALC files to support the decision for noncompetitive coding.

5.2.1 Introduction

Screening begins with the Inventory Managers (IMs). IMs have the first contact with an item in a buy position. If the Annual Buy Value is above the ALC's dollar threshold for screening, the IM initiates an AFLC Form 761, Screening Analysis Worksheet, and forwards it to the Repository (MMED) to determine data availability, adequacy, and rights determination (if the government's rights in data are in question, assistance may be requested from AFLC or the local Judge Advocate). Unless it is clearly noncompetitive, a procurement data package is assembled, starting with the top drawing. Depending on how far screening proceeds before being truncated, the Form 761 may be reviewed by an Equipment Specialist, Data Technician, Service Engineer, and a Procurement Engineer. A sample Form 761 from Warner Robins ALC is shown in Figure 5-2. As a result of the screening, a Procurement Method Code is assigned (Block 12) and a date for next review is established (Block 5). Detailed procedures are contained in ALC implementing regulations and/or supplements to AFR 57-6.

5.2.2 Approach

As described in Section 4.4, we selected fifty stock numbers each at Ogden ALC and Warner Robins ALC which were coded 3D or 3H. We requested and received the following for each item selected:

- File of AFLC Forms 761
- Procurement History
- Technical Data Package (drawings and associated lists)

We also requested a copy of the Form DD 1418, Procurement Data Record, which is authorized to be used (but not required for spare and repair parts, per AF Regulation 310-3). This record was not available at either ALC.



The requested material was structured to evaluate Hypotheses H2, H4, H9, H12, and H13.

In addition to reviewing the ALC files, we interviewed personnel who were responsible for reviewing the AFLC Forms 761 to determine their actual screening methods and procedures.

5.2.3 Findings

The ALC file which would normally be available is the file of Forms 761. The level of detail shown on the sample in Figure 5-1 is typical. Attention is invited to the general statement that complete data is not available, but due-in on a FY77 contract (date of Form 761 is April 1982). Also note that Section C, Economic Evaluation, is not filled in. In some cases, Section F contained a list of specific data which was missing, but usually there was no indication of the specific status of its projected availability.

In interviewing personnel who actually screened the Forms 761, it was determined that each organizational element screened the form from a different perspective. When the process reached the point at which it was judged that the data was missing or inadequate, the process terminated. The amount of detail and justification for noncompetitive coding shown on the form is determined by the individual concerned.

It is clear that sufficient data is not available in ALC files to support the decision for noncompetitive coding.

5.2.4 Implications

As will be discussed in connection with Hypothesis H9, the absence of a DD Form 1418 or other record of initial PMC coding or interaction with provisioning makes it impossible to evaluate the basis of current status other than by reviewing the most recent Form 761. If



SCREENING ANALYSIS WORKSHEET

(CONTINUE ON REVERSE SIDE IF NECESSARY)

PRIORITY CATEGORY

Pri 02A

SECTION A

ITEM IDENTIFICATION AND INFORMATION

1. NSN 5805-01-079-1711	2. NOUN MEMORY UNIT	3. ERRC P	4. EST PR INIT	5. UNIT COST \$ 810.01
6. R/N 9100-6	7. FSCM 11627	8. APPLICATION AFSATCOM	9. PROG YRS 82	10. EST ANNUAL BUY VALUE \$43,740.00

SECTION B

SUMMARY OF SCREENING ACTION

1. CRC <input type="checkbox"/> YES <input type="checkbox"/> NO	2. ST/STE AVAIL <input type="checkbox"/> YES <input type="checkbox"/> NO	3. SPECIFICATION/SOURCE CONTROL R/N FSCM	4. PREV CODE/DATE	5. NEXT REVIEW 12 May 83
		IM	EQ/SP	DATA TECH
		SERV ENGR		PROC ENGR
6. DATE BEGAN 10 Feb 82			7. DATE COMPLETED 10 Feb 82	
8. NAME (Print) HAZEL MORSE		9. ORGN SYMBOL/EXT MMIFAB-3/2543		
10. COMPL DATA AVAIL <input type="checkbox"/> YES <input type="checkbox"/> NO		11. DATA RIGHTS LIMTD <input type="checkbox"/> YES <input type="checkbox"/> NO		12. CODE ASSIGNED 314

SECTION C

ECONOMIC EVALUATION

1. EST SAVING/LOSS OVER FUTURE PROGRAM (ABV X A X .5 X PROG YRS) - B = \$	A. SAV FACTOR %	B. TOTAL \$ COST OF BREAKOUT
---	-----------------	------------------------------

SECTION D

PROCUREMENT SUPPORT REQUIRED

1. FIRST ARTICLE TEST <input type="checkbox"/> YES <input type="checkbox"/> NO	3. ENGINEERING INSTRUCTION <input type="checkbox"/> YES <input type="checkbox"/> NO
2. PRODUCTION SAMPLE <input type="checkbox"/> YES <input type="checkbox"/> NO	4. BID SETS <input type="checkbox"/> YES <input type="checkbox"/> NO

SECTION E

APPROVED SOURCES/SOURCE REFERENCES

1. FSCM	2. REFERENCE NUMBERS	3. SUPPLIER'S NAME	4. TYPE
A 11627	FD960380M5376	LINKABIT CORP	
B 11627	FD960380M5017	LINKABIT CORP	
C 11627	F19628-77-C-0229	LINKABIT CORP	
D.			
E.			

SECTION F

SCREENING EVALUATION/REMARKS

1. JUSTIFICATION FOR SUFFIX CODE OTHER THAN "G"
Complete DATA NOT Available DATA due in
on contract F19628 77C 0229 and update
data on other contracts

2. ACTION TAKEN/BEING TAKEN TO IMPROVE COMPETITIVE STATUS

3. REMARKS

FIGURE 5-2

the criteria for determining the usability of reprourement are known (see discussion of Hypothesis H4), it would seem prudent to indicate on the Form 761 what specifically was missing or inadequate, what action had been taken to rectify the problems, and what sort of follow-up procedure was in effect. The large numbers of references to correspondence several years earlier and old contracts indicated a lack of aggressive follow-up. Other implications will be discussed in connection with the other referenced hypotheses.



5.3 HYPOTHESIS H3

The personnel in the SPOs understand their responsibility for determining usability of technical data and have established procedures for accomplishing the responsibility.

5.3.1 Introduction

Contractors and their subcontractors prepare engineering data as an integral part of their design, development, and production effort. The Air Force relies on this engineering data throughout the life cycle of the hardware to perform management, engineering, maintenance, modification, competitive reprocurement of spares, testing, and other logistics functions.

For purposes of this study, we are considering engineering data suitable for reprocurement of identical or interchangeable items. In this context, engineering data includes engineering drawings, associated lists, and other related production documentation. This recorded information, when viewed as a whole, describes the design and manufacture, assembly sequences, processes, performance ratings, dimensional and tolerance data, input and output characteristics, mechanical and electric connections, and physical characteristics of the hardware. This data includes form and finish, details of material identification, inspection and test criteria, and calibration requirements.

Per Paragraph 3.3.3, DoD-D-10008, engineering drawings and associated lists prepared to Level 3 shall provide engineering definition sufficiently complete to enable a competent manufacturer to produce and maintain quality control of item(s) to the degree that physical and performance characteristics interchangeable with those of the original design are obtained without resorting to additional product design effort, additional design data, or recourse to the original design activity. (This is often referred to as a full design disclosure package per AF Reg 310-3.)



When considering quality or usability of technical data suitable for competitive reprourement, there are at least three aspects to consider:

- Format, legibility, and adherence to prescribed drawing practices and standards.
- Quality or suitability of individual drawings, procedures, specifications, etc.
- Overall quality or suitability of the total package for purposes of competitive reprourement.

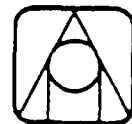
This hypothesis addresses the latter issue of overall suitability.

5.3.2 Approach

This hypothesis was evaluated by guided interviews of personnel assigned to major SPOs at ASD. In addition, the question was also discussed with other interviewees at AFLC, ALD, and the Air Logistics Centers to establish perspective. Initially we thought that interviewing selected SPO personnel would yield consistent, homogeneous responses suitable for statistical analysis. It soon became apparent that each respondent viewed the issue from the somewhat limited viewpoint of his structured position description, that there was relatively high personnel turnover (particularly military) and that there was limited documentation to form and preserve an organizational memory and history. It was often necessary to find an "old hand" who could reconstruct the history from notes or memory.

5.3.3 Findings

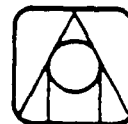
When asked who is responsible for the determination of the usability of technical data for competitive reprourement data, the answer usually turned out to be "everybody and nobody." Responsibility for the various types of drawings, associated lists, specifications, test procedures, etc. which eventually form the basis of a full design disclosure package rests with various SPO elements: engineering, reliability, quality assurance, Deputy Program Manager for Logistics (DPML), etc. The most typical response was that the question was valid and important, but that we were asking the wrong person. When asked who



the right person was, opinions varied widely: DCAS, the AFPRO/NAVPRO, SPO Engineering, the ALC, the contractor, the Air Force technical activity with engineering design or technical responsibility for the data, the agency referenced in Block 6 (Technical Office) of the DD Form 1423, Contract Data Requirements List, etc.

Most engineering data destined for the Air Logistics Centers prior to PMRT is placed on contract by the SPO, based upon input from the ALCs during the Data Call(s). The nature of the required data is specified through the use of the Contract Data Requirements List (CDRL), the appropriate Data Item Description (DID), and Ordering Data per Paragraph 6.2, DoD-D-1000B, "Drawings, Engineering and Associated Lists." After "acceptance," the engineering data is normally sent to the AFLC Repository (ALD-PTD) in batches, where it is inspected for format and legibility on a document-by-document basis. Upon "acceptance," by the Repository, a reproducible is produced and sent to the appropriate ALC. Both the AFLC Repository and the ALC Repositories file the documents (aperture cards) by Manufacturer's Code in document number sequence. At any given time, the Repositories do not have a system to know what they have actually received, what remains to be received, or what the Air Force has paid for and has not received.

When a buy is generated for an item at an ALC, personnel of the ALC Repository attempt to assemble a reprourement data package by requesting the top drawing and all documents referenced on the top drawing and lower indentured documents. If the Repository has the required data, and can find it in a completely manual system, the data is assembled and screened for completeness and adequacy. From our evaluation of Hypothesis H1, it appears as if this is the first time that technical personnel actually evaluate the overall adequacy of the procurement data package as a whole. When the ALCs buy data for their own use, there is more of a closed loop quality assurance procedure (see discussion of Hypothesis H4).



The only exception noted to this diffusion of responsibility was in the Maverick SPO. The Chief Engineer stated unequivocally that, "I am responsible for the technical adequacy of the reprourement data." But this was a special case in the sense that the Maverick SPO was in the process of competitively reprocuring the Single Rail Launcher and the IR Maverick Missile. In order to competitively reprocure these complex items on a firm-fixed-price basis, the adequacy of the data had to be conformed. Even so, it was deemed necessary to negotiate a support contract with Hughes to support the successful bidder.

We attempted, unsuccessfully, to obtain the reprourement data package for the launcher from the AFLC Repository starting with the top drawing. We later received a complete package from the SPO who ordered it directly from Hughes. In no SPO could we find established written procedures for discharging these responsibilities, although references were made in some cases to Memoranda of Understanding with AFPROs/NAVPROs.

Therefore, it must be concluded that there is not a clear understanding of SPO personnel responsibility for determining usability of technical data for reprourement and that procedures have not been established for accomplishing the responsibility.

5.3.4 Implications

In programs where ASD buys reprourement data early in a program for ultimate use by AFLC, there appears to be a disconnect caused by the relative priorities for resources and attention within the SPOs and by resource and priority constraints at the ALCs which may prevent adequate early involvement and aggressive follow-up to assure they receive a usable product which they will have to live with downstream. An acquisition strategy should be developed and implemented in the SPO to assure the timely availability of reprourement data, along with adequate resources and management interest and practices for its execution.



5.4 HYPOTHESIS H4

Clear acceptance guidelines exist for the determination of the usability of technical data being acquired for competitive spare parts acquisition.

5.4.1 Introduction

As discussed in the evaluation of Hypothesis H3, we are concerned here with the usability or adequacy of a reprourement data package taken as a whole, given that the individual pieces are correct with respect to format, legibility, and technical quality. The individual drawings or data elements may be required and acquired initially for other needs, but at some point, certain specifications, drawings, associated lists come together and are labeled as a reprourement data package.

Basically, a reprourement data package is one which would permit a competent manufacturer in that field to produce the item without additional design effort. This hypothesis addresses the guidelines available to make the above determination.

5.4.2 Approach

Our approach to this hypothesis was to interview personnel of the various organizations at ASD, AFLC, and ALD which are responsible for establishing, validating, or contracting for reprourement data. We also interviewed the personnel of Warner Robins ALC and Ogden ALC who ultimately must determine that what they have in hand is an adequate package for competitive reprourement.

5.4.3 Findings

In no case did we find any written acceptance guidelines, procedures, or check lists for determining the usability of reprourement data as a package other than the general provisions of MIL-STD-885B, "Reprourement Data Packages."

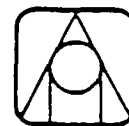


At ASD, it was generally assumed that if contract requirements were correctly specified, adequate data would be delivered through the mechanisms of contractor quality assurance responsibility, monitoring by the SPOs, AFPRO/NAVPRO personnel, and DCAS with participation of the OPR, the appropriate Air Logistics Center.

Data required by ASD for use by the ALC, finds its way to the ALC Repository, usually by way of the AFLC Repository. The ALC Repository knows in general terms what types of data are expected to be received, but can only evaluate the usability of the on-hand data when it comes time to attempt to use it. For a given item, ALC personnel start with the top drawing and assemble documents referred to on the top drawing and subordinate drawings. The search ends when all referenced documents are located (or found to be missing or inadequate). At that time, an engineer, or more likely an engineering technician, asks himself, "If I were a competent manufacturer in this field, could I produce this item from this data package without additional design effort?" This judgment call forms the basis of the PMC code assigned to the AFLC Form 761, "Screening Analysis Worksheet."

The fact that the determination is based on judgment is not meant to be critical. Engineering data can not depict everything. There is a bit of art along with the science of manufacturing; there are trade secrets, tricks of the trade, unstated procedures, techniques, processes, and other subtleties which can never be reduced to drawings, specifications, etc.

In practice, technical data packages are reviewed by appropriate ALC personnel who can read and understand the data, who are knowledgeable in the technical discipline involved (electronics, mechanical, etc.), and who are familiar with the manufacturing technology required to produce the item. In the noted absence of formal training programs, these qualified personnel are few in number and gain their expertise over a long period of time in the "school of hard knocks."



When the ALCs acquire missing data for their own use, the feedback and control mechanism seems more assured than when they receive data acquired by ASD (even though ASD may fund the data in either case). The ordering data shown in Appendix H, furnished by Warner Robins ALC, requires that the contractor furnish blueline drawings to the ALC for review and approval prior to being microfilmed. Potential problems and shortfalls can be identified and corrected before the die is cast. This sort of dialog is often not present when the ASD/ALC interface is involved.

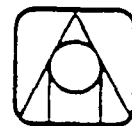
In any case, clear guidelines do not exist for the determination of the usability of technical data being acquired for competitive spare parts acquisition.

5.4.4 Implications

The first implication is that a special combination of skills is required to make such a determination: ability to read and understand engineering data, knowledge of the technical area, and knowledge of the special manufacturing techniques and process involved for the commodity or technology involved.

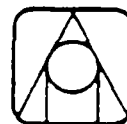
A crash effort to increase competition through breakout would require more than an infusion of manpower spaces and personnel. Basic and specialized training, which is not currently available, would be required on a long term basis. Such training programs are actually required now to provide for competent replacements for the aging workforce.

Recognizing that the ALCs are the OPR and ultimate users of reprourement data, early, intense, and continuous involvement of ALC personnel is required to develop the data requirements, actively monitor the contractor's execution, and fully participate in the technical reviews specified in the new AF Regulation 800-34, "Engineering Data Acquisition." This requirement for involvement can be translated



into the requirement for reevaluation of priorities at the ALCs for personnel spaces, technical training, and adequate TDY funds to assure that personnel of the appropriate disciplines participate in contractor plant visits, meetings, and technical reviews.

It also appears wise to require the contractor to prepare up to three aperture cards: one for the SPO (if required), one for the AFLC Repository, and one for the ALC Repository. The cost could well be below the government's cost, since the copies can be made on one set-up of the reproduction machine, eliminating the need for handling and set-up at the Repositories.



5.5 HYPOTHESIS H5

Current contracts contain required data clauses for submission of data appropriate for competitive procurement of spares.

5.5.1 Introduction

Contracts are prepared by competent personnel in contracting and are thoroughly reviewed for compliance with applicable law, the Defense Acquisition Regulation (DAR) and ASD policy prior to finalization. The question here is whether the intent of the proponent is expressed in such a way as to communicate to the contractor the actual intent of the proponent. A typical contract contains general instructions, a schedule, general provisions, and list of documents, exhibits and other documents. Part III, Section L, "General Provisions," contains a check list of applicable DAR clauses. The list of specific DAR clauses varies in content depending on contract type. The overall format is quite standardized in this respect.

Our intention in this hypothesis was to determine whether current contracts contain required data clauses for submission of data appropriate for competitive procurement of spares.

5.5.2 Approach

Our approach to this hypothesis was to review selected contracts on file at the Repository (ALD-PTD). As in the case of engineering drawings, it is necessary to know the contract number and request it by number. If it is on file and can be located, the requestor can sign it out for review. There is also a card file showing what is supposed to be on file, filed in contract number sequence without regard to weapon system or manufacturer. We contacted the major SPOs and received listings of the relevant contract numbers (A-10, F-15, F-16, B-1B, Maverick, etc.). We also selected several contract numbers at random from the card file without regard to system or manufacturer. Appendix I lists the contracts we reviewed. Appendix J lists the relevant contracts which were not available for unknown reasons (other than that they were not on file).



5.5.3 Findings

We reviewed contracts, beginning with those for the Maverick system, expecting to find a concise, readable, understandable document. The first contract received for review consisted of fourteen full file folders, occupying a complete file drawer. Subsequent contracts reviewed consisted of from three to sixteen full folders. Most contracts contained the basic contract plus literally hundreds of amendments/modifications, letters, memos, and notes. Most of the amendments/modifications and some of the basic contracts refer to previous contracts for the same or previous systems (F-15 contracts refer to F-4 contracts, etc.).

Contracts written prior to October 1977, when DoD-D-1000B was published, specify Forms and Categories of data per MIL-D-1000. Amendments/modifications subsequent to October 1977, when levels of data replaced Forms and Categories, usually continue to use the original terminology.

Referring to the checklist on the data collection form (Figure 4-5) it was simple to determine which DAR clauses were included concerning data. One section in the contracts is the standardized list of DAR clauses used by ASD for specific contract types. Other data elements were more difficult to evaluate. One question was whether MIL-STD-100, "Engineering Drawing Practices," 15 October 1978, was specified. In some cases, MIL-STD-100 was specified in the narrative portion of the contract: in other cases, it was specified on the CDRL. In still other cases, it was necessary to examine the referenced DID, which referred to various Military Standards and Specifications.

In the case of whether data was separately priced, the situation is even more difficult to determine. When certain data requirements were separately priced in the basic contract, the proliferation of amendments/modifications, which themselves contain CDRLs, clouds the issue.



To fully understand the total data requirements "somewhere in there" is extremely difficult. Unlike Air Force Regulations, which remain up-to-date by posting changes and replacing pages in the basic document, contracts stored in the Repository are changed by adding a patchwork of amendments/modifications, etc.

An area of almost uniform weakness is in the quality of Ordering Data, per paragraph 6.2, DoD-D-10008. High quality ordering data can unambiguously convey the intent of the recipient. Part of this problem developed as a result of changing from Forms and Categories of data to Levels of data. When levels of data were introduced, it was necessary to revise the corresponding Data Item Description. Initially, three separate DiDs were issued, one for each Level of data. By simply specifying the applicable DID, the Level of data was automatically specified and the importance of ordering data was somewhat undermined. Subsequently, the three separate DIDs were replaced by a composite DID covering Levels 1, 2, and 3. But now, it becomes necessary to explicitly and unambiguously specify the requirements.

We can conclude that current contracts contain the required data clauses for submission of data appropriate for competitive procurement of spares. However, the detailed actions necessary to obtain the data are not specified in the contract.

5.5.4 Implications

5.5.4.1 General

It is not enough to include the appropriate DAR clauses in the contract. As discussed in the analysis of Hypothesis H7, there must be an acquisition strategy and an aggressive management and control system, with full ALC participation to assure that the intent of the contract is realized. This is an area where the system breaks down -- a disconnect between the ASD requirement to acquire data and data rights and the ALC requirement to live with the downstream results several years later.



5.5.4.2 Program Histories

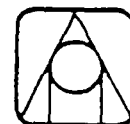
During visits to Warner Robins ALC, which is System Manager for the F-15 and Ogden ALC, which is System Manager for Maverick System, we asked the data managers to reconstruct the history of data acquisition and availability for those systems from the standpoint of the ultimate user of that data for reprourement purposes.

It is important to recognize that the Repositories at the ALCs are in the same (or worse) condition as the AFLC Repository. They have what they have, they don't know what is due in, and they don't know how much of the missing data has actually been bought and paid for by the Air Force. When it becomes necessary to review the data package for competitive procurement, the ALCs can only evaluate what they have "here and now." Holding up a purchase request to resolve data deficiencies serves only to delay the buy, increase the administrative leadtime, and degrade customer supply support.

5.5.4.3 F-15

The F-15 EAGLE is a twin-engine, fixed swept wing aircraft, designed specifically to gain and maintain air superiority. Development was begun in 1969 and production start was in March 1973.

For reprourement data, the original CDRL required McDonnell-Douglas Corp. (McAir) and vendors to select all spares that would have equated to a \$2,500 buy for all aircraft. Those selected items would be subjected to Contractor Recommended Codes (CRCs). Upon completion of CRC coding, Warner Robins representatives, including engineering and Small Business Administration personnel, visited the AFPRO at McAir to accept the Contractor Recommended Codes. For those items coded CRC6 (competitive), the Air Force went back to the contractor to buy data directly under the Deferred Requisitioning of Engineering Data (DRED) concept. A reason for employing the DRED concept was that there had been criticism during this period asserting that the Air Force was buying too much data. As it turned out, Deferred Requisitioning also became deferred funding.



When the spares were originally coded, many of the items were coded noncompetitive because it was alleged that much of the technology was too advanced to permit competition, a situation that may have been valid at the time, but may no longer be the case. In any case, Warner Robins ALC writes a Basic Ordering Agreement annually for DRED, funded by ASD.

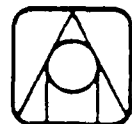
Two major problems were encountered in F-15 data from the ALC perspective:

1. McAir Data -- McAir doesn't use hard copy drawings to manufacture the F-15. Originally, ASD didn't fund to update drawings and over time, some 26,000 ECOs were generated. When McAir drawings were received, several ECOs were attached to each drawing, rendering them unusable by the ALCs. A catch-up program was initiated to update the drawings and the current contractual documents require McAir to update each drawing when five changes have accumulated.
2. Vendor Data -- PMC Coding was accomplished during the 74-76 period. Warner Robins ALC submitted the requirements for data, but other priorities caused ASD to withdraw the necessary funds. Funds did not become available until the 78-79 time frame. Warner Robins resubmitted its requirements, but by this time, many vendors claimed proprietary rights and chose not to bid. Warner Robins ALC has been buying vendor data through purchase orders issued directly to the vendors.

Currently, the perception of Warner Robins ALC is that, for McAir data, almost all required data has been delivered or is on order. For vendor data, data from fourteen vendors is on order, two need additional funding, two don't have firm pricing, and twelve items may be proprietary. The above represents the data availability situation today, ten years after production start.

5.5.4.4 AGM-65 Maverick Missile System

The Maverick Air-to-Ground Missile System consists of a launcher and a missile. There are three basic versions of the missile: the TV missile, the IR missile, and the Laser missile. The original



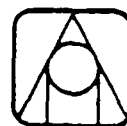
intention was to require reprourement data for repairable assemblies, but not below the source/specification control drawing level. The drawings are Hughes Peculiar and not under government control. The Air Force pays Hughes to retain all drawings in the Hughes Repository. On the missile, Hughes claimed that twelve items were proprietary and later abandoned the claim for nine. Hughes priced the rights for the other three at \$5M on a "take it or leave it" basis.

The single rail launcher (LAU 117A) was successfully procured competitively in FY 1979. At the time of award of the firm fixed price contract to VARO, Inc., the SPO did not guarantee the adequacy of the technical data. A separate support contract was negotiated with Hughes, which had contractual responsibility for maintaining the currency of the launcher data.

The SPO is currently in the process of selecting a source for the competitive reprourement of the IR missile.

From interviews with the data management and system management personnel at Ogden ALC, the history of Maverick data acquisition and availability is described below.

When Ogden ALC submitted its original data requirements to the SPO, it requested formal military data. The SPO position was that Hughes would develop interim data and deliver it to the Air Force as available. Three sets would be delivered: one set for Ogden ALC, one for the SPO, and one set for the AFLC Repository. Hughes' interpretation of MIL-STD-100 was different from the Air Force's in several respects. Hughes submitted many source control drawings, supposedly listing all sources. But it turned out that Hughes listed only one source -- Hughes! Another problem is that Hughes has different, unique drawing practices. Hughes doesn't need military standard drawings for its own use, and all vendors perform against a Hughes specification. Even the process specifications are Hughes specifications. When the ALC attempts to repro cure competitively, it is difficult for prospective bidders to read and interpret bid sets.



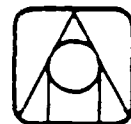
The SPO originally intended to replace the interim data with formal military data, but cancelled the requirement to save money (about \$700K). As a result, most of the Maverick data is still interim.

When the SPO was directed to competitively procure the single rail launcher, it was necessary to pay Hughes to redraw the drawings, to change many Hughes standards to military standards, and to act as a support contractor to the successful bidder, VARO. (Basic Contract Price was \$1 million.) The same thing happened when it was determined to competitively reprocur the IR missile.

The general consensus is that the currently available Maverick data is usable, thanks primarily to the AFPRO at Hughes in Tuscon, which assumed responsibility for quality control of the data.

5.5.4.5 Summary

Current DAR clauses, regulations, and policies are adequate to permit and ensure that the Air Force receives data suitable for competitive procurement of spares. The responsible ALC should have early and strong participation in determining data requirements and should actively participate in the program management and control system to assure that the contract provides the necessary provisions and that these provisions are adhered to. The ALC needs lists of deliverable data to be used as a due-in file, so that they know what they should have, what they actually have received, and what remains to be delivered. Priorities and TDY budgets should be structured at the ALCs to assure that the required specialists can fully discharge their responsibilities as listed in AF Regulation 800-34.



Increased breakout and competitive procurements can be accomplished at the ALCs only if adequate reprourement data is available when required. If the problem is not attacked early in the acquisition process, the ALCs will continue to remain behind the power curve, attempting to solve data problems not of their making. Currently, the pressure for increased competition is focused on the ALCs, which are the beneficiaries of problems whose seeds were irrevocably sown early in the program.

Finally, several personnel cautioned that it may be invalid to evaluate "old" programs and contracts, asserting that we've learned our lessons and that now we are doing things right. But in reviewing "new" programs such as the F-16 and the B-1B, there is little evidence that the observed systemic problems have been addressed or solved in these programs. The groundwork is currently being laid for continued data acquisition and availability problems in the future. The later these problems are addressed, the more difficult and costly will be the solutions.



5.6 HYPOTHESIS H6

The process for challenging restrictive markings on data is well understood by ALC personnel.

5.6.1 Introduction

Contractors may furnish engineering data to the government with restricted rights, based upon the claim that the item, process, material, or other feature causes the item to be proprietary. If such a claim is valid, the government can not release the data to other potential manufacturers or suppliers. If the Air Force needs unlimited rights to items that are determined to be properly subject to limited rights, these rights must be acquired prior to use.

In determining the validity of a claim that data is restricted, the basic test is who paid for the development cost. Especially in these times when the government encourages industry to use its own funds for developing new products and technology and thus share research and development financing, it is not reasonable to expect the private developer to furnish data that will permit someone else to manufacture a similar product using that data unless he consents and receives compensation. However, when there is cost sharing on a research and development project, the government has unlimited rights, since the government has clearly furnished at least a portion of the funding.

The problem addressed here is what action the ALC can or should take when data is needed for competitive reprourement of an item and one or more data element is marked "Restricted," with what is perceived as questionable validity. The problem is often aggravated by the fact that the data in question may have been acquired by ASD several years prior to its intended use for competitive reprourement.



The new AF Regulation 800-34, published in April 1983, addresses what should be accomplished early in each program:

- "The program manager will ensure that the procuring contracting officer (PCO) includes the "Predetermination of Rights in Technical Data" clause (DAR 7-2003.61) in solicitations and the "Notice of Certain Limited Rights" clause (DAR 7-104.9(b)) in both solicitations and contracts. These clauses require the contractor to notify the PCO when the contractor or any subcontractor, vendor, or supplier to the contractor intends to use any item having data subject to limited rights."
- "Claims of data subject to limited rights must be resolved promptly. If the claim is to be challenged, the PCO will task the contractor to provide clear and convincing evidence to support the rights claim and the price for the purchase of unlimited rights for the item. Upon resolution of the claims, the Engineering Data Management Officer (EDMO) will furnish the decisions to the system manager's ALC/MMED organization and the USAF Engineering Data Support Center. If the Air Force needs unlimited rights to items that are determined to be properly subject to limited rights (for example, for follow-on acquisition, to disclose new technology, or to effect organic or contractual maintenance or modification), those rights should be acquired while competition still exists among alternative contractors."
- "A data list will be acquired which identifies all data to be contained in the Level 3 data package as defined by DoD-D-1000. The data list will identify those documents that have validated limited rights. Although items with valid limited rights cannot be used in procurement data packages to other contractors, they are required to be delivered in the Level 3 package for other support or management needs."

5.6.2 Approach

To evaluate this hypothesis, we interviewed personnel at Warner Robins ALC, Ogden ALC, and other ALCs using the Air Force Institute of Technology's Teleteach System. At Warner Robins and Ogden ALCs, we interviewed personnel directly involved with the Repository and those who reviewed the AFLC Form 761, Screening Analysis Worksheet, as well as the representatives of the Contract Law Section of the Office of Judge Advocate.



5.6.3 Findings

Except for a statement in Ogden ALC's Regulation 57-6 under the Staff Judge Advocate (JA) responsibilities, "Upon request, determine the government's rights to use available data for competitive acquisition," we found no evidence of formal, documented procedures for challenging restrictive markings on data. The Judge Advocate representatives are available for consultation on such matters, but do not solicit business, nor are they part of the review process for items coded with PMC Suffix Code "R" (the data or the rights to use the data needed to purchase this item from additional sources are not owned by the government and it has been determined that is uneconomical to acquire them by purchase).

Personnel in the Repositories occasionally refer questions of restricted data to the local JA with mixed results. Others stated that if they wanted to challenge restrictive markings, they would go back to the AFLC Repository or JA for resolution rather than the local JA. Their reasoning was that there was no point in fighting a local battle on an issue that had already been addressed by AFLC when the data had been initially acquired. However, there was no evidence at the AFLC Repository that the mission included challenging restrictive markings.

Based upon the above, it must be concluded that the process for challenging restrictive markings on data is not well understood by ALC personnel.

5.6.4 Implications

Until the procedures outlined in AF Regulation 800-34 are followed and claims of proprietary data are promptly and effectively challenged on a case-by-case basis, the ALCs will continue to encounter the problem. It is extremely difficult to reconstruct the conditions which would invalidate the contractors claim years later. Even if a challenge is successful, it is a time and resource consuming activity and during the process, the claimant maintains his competitive



(or non-competitive) edge. If the procedures in AF Regulation 800-34 are not followed early in the program, restrictive data will continue to inhibit competitive reprocurement of many items.



5.7 HYPOTHESIS H7

Criteria exist for early definition of data requirements for competitive acquisition of spare parts.

5.7.1 Introduction

Each major weapon system acquisition is different and unique, and must be tailored to those unique aspects of the specific program. This fact is recognized in DoD Directive 5000.1, "Major Systems Acquisitions," 29 March 1982. Among many relevant provisions of this Directive are the following excerpts:

- "Improved readiness and sustainability are primary objectives of the acquisition process. Resources to achieve readiness will receive the same emphasis as those required to achieve schedule or performance objectives." (para 2b)
- "DoD components shall: Develop an acquisition strategy at the inception of each major acquisition that sets forth the objectives, resources, management, extent of of competition, proposed contract types, and program structure (such as, development phases, decision milestones, test and evaluation (T&E) periods, planned concurrency, production releases) and tailors the prescribed steps in the major system acquisition decision-making process to this strategy." (para 2c(5))

This theme cascades throughout the derivative directives and regulations. One of the stated objectives of AF Regulation 310-1, "Management of Contractor Data," 8 March 1983 is: "to tailor standard data requirements to meet program needs consistent with this regulation."

The quandary is that it is desirable to define data requirements early to communicate our requirements to the contractor and reduce total costs related to engineering data acquisitions. Yet we must wait long enough to avoid specifying what data is to be acquired before the requirements are actually known and design stability is achieved.



DoD-D-1000B, "Engineering Drawings and Associated Lists," 28 October 1977 designates Levels 1, 2, and 3 which provide for a natural progression of a design from its inception to production. It is clear that, for competitive reprourement, Level 3 drawings, associated lists, and the Type Clb (Prime Item Product Fabrication) specifications will be required for those items to be reprocured. But do we need Level 3 drawings for everything? Could we afford them? We probably don't need data for airframes and perhaps not for engines which have Reliability Improvement Warranties. Where can we draw the line?

A carefully planned provisioning strategy is essential to the effectiveness and supportability of a new system. The necessary elements of the planned strategy must be included in the contractual documentation as early as possible in the validation phase of the program. The provisioning requirements must be included as part of the full scale engineering development (FSED) Request for Proposal.

A significant output of the provisioning process is Source, Maintainability, and Recoverability (SMR) coding. Those items source Coded P (procurable) become candidates for Procurement Method (PMC) Coding. Those items PMC coded for competitive procurement are the items for which a Full Design Disclosure Package is required.

This hypothesis examines whether criteria exist for early definition of data requirements for competitive acquisition of spare parts in the above context.

5.7.2 Approach

Having reviewed the relevant directives, policies and regulations in Phase 2 of this study effort, we evaluated this hypothesis by conducting guided opinion interviews with personnel from ASD, ALD, Hq AFLC, and personnel at the Air Logistics Centers. A specific question was, "At what point in the development cycle is the detail available to form a basis for a decision to acquire data and data rights for specific items within a weapon system?"



5.7.3 Findings

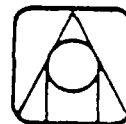
Recognizing that each program is different, including degrees of concurrency, opinions and responses varied widely. The consensus was that the decision could be tentatively made after the Critical Design Review, but a final decision could be made only after the Physical Configuration Audit and availability of the Prime Item Product Fabrication Specification. Per AFLC/AFSC Pamphlet 800-34, "Acquisition Logistics Management," 12 August 1981, "The Physical Configuration Audit (PCA) is the formal examination of the "as built" configuration of a Configuration Item (CI) against its technical documentation or product baseline. - - - - PCA typically occurs at the time of first production item, new contractor manufacturing CI for the first time, new production by original contractor after a break in production, first production of new significantly changed CI, and so forth - - - -. Changes to a configuration Item, once the PCA is accomplished, are carried out only as directed by engineering change procedures . . ."

By any definition, a decision made at that time is "late" rather than "early." The most profound response made by a representative of ASD/AWZ was, "There is a right time to do things -- do it when it makes sense. Meanwhile, Interim Contractor Support is appropriate in those cases where design stability has not been achieved."

From the foregoing, it is clear that criteria does not exist for early definition of specific data requirements for competitive acquisition of spare parts.

5.7.4 Implications

Specific data requirements can't be defined early, but if the SPO doesn't establish the contractual framework and environment for data acquisition early, the seeds are sown for downstream technical and financial problems, as well as creating almost insurmountable impediments to breakout and competitive reprocurement of spares.



Methods of coping with this problem have met with limited success. As discussed under Hypothesis H5, Deferred Requisitioning of Engineering Data (DRED)* is not successful unless the details and pricing structure are defined early and managed aggressively.

The solution, reflecting the policy outlined in AFR 800-34 appears to be:

- 1) Establish an acquisition strategy from the outset which explicitly addresses the acquisition and pricing of data for reprourement and other purposes.
- 2) Include the implementation of that strategy in the Program Master Plan (PMP), the Integrated Logistic Support Plan (ILSP), Logistics Support Analysis (LSA), etc.
- 3) Address the acquisition strategy and Air Force intent contractually from the beginning in solicitations, Requests for Proposals, and contracts. This will establish and maintain the legal and philosophical dialog to assure that the mechanisms for data acquisition are assured.
- 4) Perhaps most important, establish a strong management control system, including early and strong participation by the Air Logistics Centers, to execute the contract provisions and assure that the Air Force receives correct data at the correct time for its intended purpose.

*Deferred Requisitioning of Engineering Data (AFPI 71-687): A situation in which the contract specifies the range and kinds of drawing copies or masters the contractor is obliged to deliver when ordered by the government and prescribes ordering conditions and pricing terms. It provides for interim retention of masters by the contractor, in prescribed format, and delivery of copies direct to the Air Force user when specifically requisitioned by the government.



5.8 HYPOTHESIS H8

The qualitative and quantitative resources to support the requirements of AFR 800-34 at the ALCs can be identified.

5.8.1 Introduction

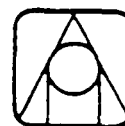
Air Force Regulation 800-34, "Acquisition Management-Engineering Data Acquisition," which establishes policies and defines responsibilities for acquiring engineering data, was published April 1983. It is widely believed that, if followed, the regulation will go a long way toward solving many of the problems addressed in this research project.

According to representatives of the OPR, the Air Staff (LEYE), there was some concern that the regulation is manpower intensive, requiring the Air Logistics Centers to accomplish several tasks which were not currently being staffed and resourced at the required level of effort. These requirements are listed in Figure 4-9.

This hypothesis was developed to determine the extent to which the Air Logistics Centers have identified the qualitative and quantitative resources to support the requirements of AFR 800-34.

5.8.2 Approach

It was assumed that AFR 800-34 would have been published and distributed by the beginning of Phase 3 of this research effort or at least that ALC personnel would be familiar with the provisions of the final version as submitted for publication. Therefore, our approach was to interview knowledgeable personnel at the ALCs and the sponsor of the regulation at Hq, AFLC.



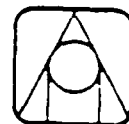
5.8.3 Findings

Air Force Regulation 800-34 had not been published and distributed to the Air Logistics Centers. Except for general familiarity with the related AFLC/AFSC Pamphlet 800-34, which is nondirective in nature, ALC personnel were not familiar with the provisions and potential resource impacts of AFR 800-34. However, several relevant findings were made during interviews and discussions.

The AFLC sponsor for AFR 800-34 stated that the ALCs had coordinated on the regulation and that there are no requirements in the regulation which are not currently required for a well managed program. Therefore, the regulation serves only to document the process.

At the visited Air Logistics Centers, we confirmed what had been asserted during the Teleteach Conferences. In most cases, manpower spaces are justified and requested based upon accumulated workload data based upon actual work performed. For example, System Managers can only justify additional spaces for a program after PMRT, based on actual work performed. This process normally takes 18-24 months. In the face of continual cuts in personnel spaces, the justification for additional personnel spaces often translates into justification for assuming less than the proposed allocation of the cuts.

A second recurring comment was that the ALCs couldn't fulfill their requirements for attending meetings, conferences and making contractor plant visits because of a chronic shortage of TDY funds. It was not clear whether it was actually a shortage of ALC TDY funds or a question of relative priorities. In addition, local policy was that only one representative from a given organization could go to the same event, even though a single person could not adequately represent the ALC's interests. A single person representing a specific area of expertise is at a great disadvantage when playing on the home court of a sophisticated contractor with a battery of technical experts available on call.

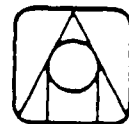


The Air Logistics Centers are characterized by an aging workforce, with relatively high internal turnover of personnel accompanied by a lack of formal training courses in data and data management. Personnel who have been trained by OJT over a long period of time are assigned the jobs for which they are uniquely qualified. Therefore, numbers of available personnel are not as important as the technical qualifications of the incumbants. An infusion of spaces and personnel will not solve the problems unless accompanied by an aggressive training program including data management, how to read drawings and contracts, and the general subject of manufacturing technology.

Based upon the above, it is clear that the qualitative and quantitative resources to support the requirements of AFR 800-34 at the ALCs have not been identified.

5.8.4 Implications

If the responsibilities outlined in AFR 800-34 are merely a statement of what should be done as a part of good management and they are not being accomplished now because of resource constraints, then publishing the regulation will not have any significant effect. Only by providing resources, adequate training, and perhaps reordered priorities, will the observed deficiencies be corrected. In this connection, increased automation of data processing, storage, and retrieval as well as other administrative records and files is clearly required.



5.9 HYPOTHESIS H9

PMC files show interaction with the provisioning process.

5.9.1 Introduction

Per AF Regulation 65-2, "Provisioning of End Items of Material," provisioning is a management process for determining and acquiring the range and quantity of support items needed to operate and maintain an end item of material for an initial period of service. The objective of provisioning is to ensure the timely availability of minimum initial stocks of supporting items at using organizations and at wholesale level maintenance and supply activities to sustain the programmed operation of end items until normal replenishment can be effected.

Provisioning closely parallels the end item acquisition program. The maintenance concept provides the guidelines for selection and allocation of spare/repair parts which, in turn influence such items as support equipment, maintenance manuals, training programs, facility requirements, and storage locations. Data generated and recorded during provisioning provide the foundation for many subsequent maintenance and supply operations.

A significant output of the provisioning process is Source, Maintainability, and Recoverability coding. Those items source Coded P (procurable) become candidates for Procurement Method Coding. When a PMC code is assigned to an item, the code becomes a message to the procuring activity prequalifying (or disqualifying) potential sources and determining the item's competitive status for life unless subsequently reviewed and changed. The PMC code also forms a basis to decide what reprourement data to acquire.



While there is no conceptual reason why provisioning and PMC coding couldn't be accomplished in concert, these two activities are normally accomplished separately by different groups (and using different funding).

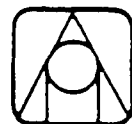
AF Regulation 57-6, "High Dollar Spare Parts Breakout Program," authorizes the use of DD Form 1418, Procurement Data Record, (shown in Figure 5-3). If used, this form could record the progression of decisions and actions taken with respect to provisioning, PMC coding, and data acquisition.

AFSC/AFLC Supplement, AF Regulation 310-3, "Acquisition and Management of Data for Follow-On Procurements," requires the use of this form "except for spare and repair parts" and specifies that, when used, a copy of each completed DD Form 1418 will be sent to the appropriate AFLC SM/IM ALC (MMEDD). The Supplement also states that "each time an item is subsequently procured, the technical information recited in DD Form 1418 will be updated and the validity of the previously assigned PMC reevaluated."

The intent of this hypothesis was to determine whether PMC files at the ALCs show interaction with the provisioning process in the framework established above.

5.9.2 Approach

As previously described, we requested PMC coding data, any Forms DD 1418, procurement histories, and data packages for 50 items each at Warner Robins ALC and Ogden ALC for review. This information was requested about two weeks prior to our visits to provide sufficient time to assemble the material.



PROCUREMENT DATA RECORD				Form Approved Budget Bureau No. 22-R234	
NAME AND ADDRESS OF CONTRACTOR OR SUPPLIER			PROCUREMENT ACTION CODE CONTRACTOR RECOMMENDED CODE (CRC) _____ DATE _____ PROCUREMENT METHOD CODE (PMC) _____ DATE _____		
CONTRACTOR OR SUPPLIER <input type="checkbox"/> NEEDED <input type="checkbox"/> NOT NEEDED DATE _____			NEXT REVIEW ACTION GOVERNMENT <input type="checkbox"/> NEEDED <input type="checkbox"/> NOT NEEDED DATE _____		
SECTION I - IDENTIFICATION					
1. FSN		20. PART NUMBER		20. NOMENCLATURE	
20. SPECIFICATION OR SOURCE CONTROL NUMBER		20. FCSH		40. CONTRACT NUMBER	
40. CONTRACT ITEM NUMBER		40. CONTRACT MODEL NUMBER		40. CONTRACT METHOD OF PROCUREMENT <input type="checkbox"/> MAKE <input type="checkbox"/> SOLE SOURCE <input type="checkbox"/> COMPETITIVE	
SECTION II - PROVISIONING INFORMATION					
5. SOURCE DOCUMENT REFERENCE			6. SOURCE CODE		
70. ESTIMATED UNIT COST \$			70. ESTIMATED ANNUAL ISSUES		
70. ESTIMATED ANNUAL COST \$			6. ESTIMATED PRODUCTION LEAD TIME (Weeks)		
SECTION III - DESIGN STATUS					
9. <input type="checkbox"/> STABLE <input type="checkbox"/> UNSTABLE					
SECTION IV - MANUFACTURING CRITERIA					
10. MASTER TOOLING		YES NO		14. HIGH REJECTION	
11. SPECIAL TESTS OR INSPECTION		YES NO		14. HIGH RELIABILITY	
12. CLASS 1 CASTINGS OR FORGINGS		YES NO		16. OTHER	
13. SPECIAL PROCESS OR MATERIAL		YES NO			
SECTION V - PROCUREMENT DATA PACKAGE					
17. CONTRACT REQUIRES DELIVERY OF ADEQUATE PROCUREMENT DATA		YES NO		180. LIMITATIONS ON USE OF DATA INVOLVED	
180. CAN GOVERNMENT ACQUIRE PROCUREMENT DATA NOT REQUIRED BY CONTRACT		YES NO		180. CAN GOVERNMENT ACQUIRE UNLIMITED RIGHTS	
180. ESTIMATED COST OF ADDITIONAL PROCUREMENT DATA \$		YES NO		180. ESTIMATED COST OF OBTAINING UNLIMITED RIGHTS \$	
SECTION VI - TOOLING AND FACILITIES					
190. SPECIAL TOOLING <input type="checkbox"/> YES <input type="checkbox"/> NO		190. OWNERSHIP <input type="checkbox"/> GOV'T <input type="checkbox"/> PRIME <input type="checkbox"/> SUPPLIER		190. LOCATION (PMC)	
190. AVAILABLE FOR OTHER PROGRAMS <input type="checkbox"/> YES <input type="checkbox"/> NO		190. OTHER FACTORS <input type="checkbox"/> YES <input type="checkbox"/> NO		190. ESTIMATED COST \$	
20. SPECIAL PRODUCTION FACILITIES <input type="checkbox"/> YES <input type="checkbox"/> NO		210. SPECIAL TEST EQUIPMENT <input type="checkbox"/> YES <input type="checkbox"/> NO		210. OWNERSHIP <input type="checkbox"/> GOV'T <input type="checkbox"/> PRIME <input type="checkbox"/> SUPPLIER	

DD FORM 1418

REPLACES EDITION OF 1 NOV 1964

Page 1 of 2 Pages

FIGURE 5-3 PROCUREMENT DATA RECORD

SECTION VII - QUALIFICATION, INTEGRATION, RELIABILITY TESTING							
COMPLETE IF SECTION IV - 11 CHECKED "YES". EXPLAIN FACTS IN "REMARKS" SECTION.		IDENTIFY SPECIFICATION					
21a. QUALIFICATION TESTING <input type="checkbox"/> YES <input type="checkbox"/> NO		21. ESTIMATED TIME AND ADDITIONAL COST TO GOVERNMENT					
21b. INTEGRATION TESTING <input type="checkbox"/> YES <input type="checkbox"/> NO		QUALIFICATION TESTING	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center; padding: 2px;">TIME</th> <th style="width: 50%; text-align: center; padding: 2px;">COST</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td style="text-align: center; vertical-align: middle;">\$</td> </tr> </tbody> </table>	TIME	COST		\$
TIME	COST						
	\$						
21c. RELIABILITY TESTING <input type="checkbox"/> YES <input type="checkbox"/> NO		INTEGRATION TESTING	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center; padding: 2px;">TIME</th> <th style="width: 50%; text-align: center; padding: 2px;">COST</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </tbody> </table>	TIME	COST		
TIME	COST						
22. RESPONSIBLE AGENCY <input type="checkbox"/> GOVERNMENT <input type="checkbox"/> PRIME <input type="checkbox"/> SUPPLIER		RELIABILITY TESTING	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center; padding: 2px;">TIME</th> <th style="width: 50%; text-align: center; padding: 2px;">COST</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </tbody> </table>	TIME	COST		
TIME	COST						
SECTION VIII - REMARKS (If additional space is needed for remarks, use additional pages)							
SECTION IX - CONTRACTOR OR SUPPLIER APPROVAL							
PREPARED BY (Typed name and Signature)		TELEPHONE NUMBER AND EXTENSION					
APPROVED BY (Typed name and Signature)		DATE	TELEPHONE NUMBER AND EXTENSION				

Page 2 of 2 Pages

FIGURE 5-3 PROCUREMENT DATA RECORD
(cont'd)

5.9.3 Findings

No Forms DD 1814 or equivalent data was available at either ALC. In fact, no one interviewed at ASD, ALD, AFLC, or anywhere else admitted to having ever seen one. It was alleged that the form had been replaced by computer product, but such a product could not be furnished.

What was available was the latest AFLC Form 761, "Screening Analysis Worksheet," or in some cases, the latest two or three 761's. In all cases, the total screening analysis was accomplished on the basis of what was actually available in hand at the time of the screening. There was no basis to evaluate original provisioning and PMC coding decisions, what data had been acquired, or an evolution from the early intent to the current status of an item's coding and competitive status.

Therefore, it is concluded that ALC files do not show interaction with the provisioning process.

5.9.4 Implications

The key to competitive reprourement is the availability of adequate technical data. Sometimes, early decisions on provisioning and PMC coding are made on assumptions that the technology involved is too complex (as in the case of the F-15) to permit competitive reprourement. In that case, which may have been valid at the time but no longer true, certain data wasn't acquired. In other cases, the decision was made to acquire data for purposes of competitive reprourement and, for some reason, the data has not reached the files to permit its use. The ALC personnel have no way to tell much beyond the fact that they have what they have and they don't have what they don't have. In the absence of an audit trail, the validity of early decisions and the evolution of technological and market conditions can't be reevaluated in a meaningful manner.



5.10 HYPOTHESIS H10

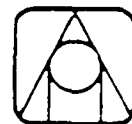
Improvements could result from establishing a connection between Logistics Support Analysis and the Procurement Method Coding Process.

5.10.1 Introduction

Logistics Support Analysis is an iterative effort accomplished within the systems engineering process to identify, define, analyze, quantify and process logistics support requirements. These requirements reflect a balance among system elements which dictate logistics requirements including readiness, operational capability, reliability, maintainability, survivability, vulnerability, and life cycle cost. After establishing a balance of requirements and constraints, analyses are conducted on the evolving hardware design to determine maintenance and support requirements for the system. LSA tasks are iterated several times as the design progresses in order to gain more insight or obtain greater definition of detail. As the LSA process is being accomplished, expected future needs for spare parts purchase can be estimated. Since LSA is an in-depth analysis of the logistics expectation of the system, estimates of the quantity of spare parts required should serve as a valid basis for determining reprourement data requirements.

5.10.2 Approach

After reviewing the relevant directives, policies and regulations in Phase 2 of this study effort, we evaluated this hypothesis by conducting guided interviews with personnel from ASD, ALD and the two ALCs visited as part of the Phase 3 effort. The specific question addressed was, "Would the data from the Logistics Support Analysis process provide improved ability to project data requirements?"

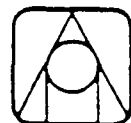


5.10.3 Findings

Logistics Support Analysis did not seem well understood by the personnel in our data sample. With the exception of two people at one ALC, there was little specific knowledge concerning LSA and its contribution to system development or to eventual competitive spares purchase. The only instance found in the interviews of active LSA involvement was on the Maverick program. But even in this case, it was primarily in support of a unique Navy requirement on the Maverick. The general theme of the responses to our questions on LSA was that it was a requirement in the contract, but the results had low visibility in terms of influencing decisions or future actions.

5.10.4 Implications

The types of analyses accomplished as part of the LSA process could make a major contribution to the early definition of required data. ALC and SPO personnel should use LSA output data which identifies expected needs for repair and parts replacement to identify the items which are expected to require spares acquisition. In the forward planning of the support concepts and approaches, the prime contractor should be required (via a change to MIL-STD-1388-1 and 1388-2) to identify the forecast procurement method (competitive or noncompetitive) of the parts required for maintenance or replacement.



5.11 HYPOTHESIS H11

System prime contracts show the price paid for technical data necessary for competitive spares procurement.

5.11.1 Introduction

The technical data which ultimately becomes a Procurement Data Package or Full Design Disclosure Package is developed in response to other requirements as well as for reprourement (Engineering, Test, Quality Assurance, etc.). The data is also used for other purposes, such as maintenance and repair.

There are three basic approaches to acquiring reprourement data:

- (1) From the outset, negotiate the price for Level 3 data and associated lists and the rights to that data and include that requirement in the initial Request for Proposal. Use the contractor's response as part of the proposal evaluation criteria. The new AFR 800-34 states that, "A contractor's priced proposal should include the cost of engineering data and should be submitted while competition exists in order to minimize the total purchase price." It is also necessary to provide for updating data as various changes, modifications, and Engineering Change Proposals proliferate. This adds to the difficulty of isolating the true price of data.
- (2) Specify various types of data requirements on Contract Data Requirements Lists (DD 1423), make a separate 1423 for reprourement data, using ordering data as defined by paragraph 6.2 of DoD-D-1000B and Data Item Description DI-E-7031. (A sample of appropriate ordering data used by Warner Robins ALC is shown in Appendix K.)
- (3) The third and most common approach is to defer the acquisition and pricing of reprourement data and fight the problems as they arise.

In any case, prices allocated to reprourement data should be shared or prorated with other beneficiaries of the required data (maintenance, repair, etc.).



AD-A148 258

INCREASING COMPETITION FOR SPARES WITHIN AFLC (AIR
FORCE LOGISTICS COMMAND)(U) ANALYTICS INC DAYTON OH
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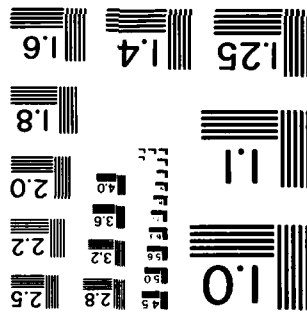
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One thing is clear: Level 3 data and associated lists are required by the contractor for his own use before he can manufacture the first item (even if it is stored in a computer aided design or manufacturing system). In determining what data should cost, there are several considerations:

- What does the contractor require for his own purposes, whether or not the Air Force wants to acquire it?
- To what commercial or government standards, specifications, format, or drawing practices does the contractor's data conform? There is a cost to conform to MIL-STD-100, DoD-D-1000B, etc.
- What are the contractor's costs for reproducing, microfilming, and other technical and administrative processing of data for delivery to the Air Force?
- How are data preparation, data management, and other related activities accommodated within the contractor's cost accounting system? It is often difficult to determine where "work" leaves off and "data" begins. How can the Air Force assure that whatever is priced as data is not also priced elsewhere in the contract?

5.11.2 Approach

This hypothesis was evaluated by reviewing contract files (in conjunction with Hypothesis H5) and interviewing personnel in ASD/AW, various SPOs, and personnel in the ALCs.

5.11.3 Findings

Based upon considerations contained in the introduction, the findings reported for Hypothesis H5, and interviews, it is clear that the actual costs for technical data solely necessary for competitive spares procurement cannot be determined by reviewing the contract files. Unless the price of data and rights is part of the initial RFP and negotiated from the outset, the contract becomes a "living document," subject to amendments/modifications, agreements, and interpretations. The price of data, including reprourement data is "buried in there somewhere." After contract completion and close-out, it would be an accountant's



nightmare to attempt to determine the total price to be allocated to reprourement data and to determine which elements of that price to prorate among other users of that data for different, but related purposes.

ASD/AW personnel concluded that the only way one could determine the actual price of data was to have a contract for data only. Even when priced up-front, per AFR 800-34, the stated price may be specious. It has been estimated (by Mr. Tischer, ASD/AW) that the price of data in negotiated procurements is about 8% of the contract price. When negotiators for the Air Force and the contractor get within about 5%, one approaches the noise level. When the final negotiated price is agreed upon, it is difficult if not impossible to determine where the final concessions were made.

Based upon the above, it is concluded that current system prime contracts do not show the price paid for technical data necessary for competitive spares procurement or for the true price of maintaining the currency of that data.

5.11.4 Implications

Given the complexity of current weapon systems, the changes and modifications of the hardware overtime, and the resulting "living contract," the only way to adequately minimize the cost of engineering data to the Air Force is to make data acquisition for reprourement an explicit part of the acquisition strategy from the beginning and, at a minimum, negotiate the pricing structure for data and data rights while competition among potential contractors still exists.



5.12 HYPOTHESIS H12

Data exists which shows the cost of completing an incomplete or illegible data package by the ALC.

5.12.1 Introduction

Our review of the IMSS-11 Procurement Method/PMC Suffix Code Report (RCS: DLA(Q)-1739-11(S) 28 March 1982 and 31 December 1982) showed a high proportion of the noncompetitive codes falling under Suffix Codes D (data not available) and H (inadequate data). If the ALC is to competitively purchase the items in these suffix codes, it will be necessary to complete the data packages. In addition, any rigorous economic analysis of the process for competing spares procurement must include these costs.

5.12.2 Approach

The data sample reviewed in the evaluation of Hypothesis H1 (see Figures 4-11 and 4-12) were drawn from items Suffix Coded D and H. Since the ALC is charged with the responsibility for completing these packages, we would expect to find evidence, in the ALC files, of the actions necessary to achieve this end. Where data has been purchased to complete the package, or other similarly directed actions have been accomplished, the evidence of these actions could be used as a basis for generation of appropriate cost data.

5.12.3 Findings

There was no specific information on cost to complete data packages. When the original data delivery date had not occurred, the file showed no action taken, which was appropriate. For those cases in which the ALC believed the data should have been included, typically, two actions were taken. The first was a call to the AF EDSC at Wright-Patterson AFB to determine if the data were available in their files. The second was a letter to the concerned contractor requesting:



- a. Delivery of the data, or
- b. A price quotation for the data, or
- c. Advice on previous delivery, or
- d. Notice that data will not be furnished and cannot be procured.

In no case did we find a price quotation for data. For those items which were submitted, the ALC personnel indicated that as a general rule, contractors charged about \$30 per drawing as a handling and shipping fee.

5.12.4 Implications

There is little or no hard data on the cost to purchase data to complete data packages. It appears that many contractors, once in a de facto sole source situation, refuse to provide or sell data rights to the government. Since the original acquisition contracts for these items are old and closed, the ALCs have limited ability to determine if the contractor was obligated to provide the data. As a result, the ALC's ability to complete these packages to support competitive procurement is extremely limited.

This situation often arises from the fact that the ALC (and the AFEDSC) never knew what data was supposed to be delivered on a particular contract. The most efficient solution to this problem is to ensure that data delivery requirements include data lists which identify the specific drawings and other documents to be provided (see discussion in Paragraph 3.1.4 for detailed discussion of these data lists).



5.13 HYPOTHESIS H13

There is auditable data which shows the savings attainable by competitive spare parts acquisition.

5.13.1 Introduction

One of the primary motivations for emphasis on competitive spare parts acquisition is the perception that it will result in reduced prices for the spares purchased. AFR 57-6 states that in the development of economic analyses, savings of 25% be used for estimating the results of a competitive buy. The level of savings which can be obtained is critical in formulating any economic model (as required in Phase 4) of the competitive spares acquisition process.

5.13.2 Approach

The data for this hypothesis was drawn from a number of areas. The first area evaluated was the 57-6 files at the ALCs visited. Data was available in these files but they were not easily identified and located. Ogden ALC (MMIRS) personnel are compiling data from these files which is to be provided to Analytics during the last week in April 1983. The second major area explored was the local representative of the Small Business Administration. At the Ogden ALC, we were provided with a copy of the data submitted to SBA on the competitive breakouts facilitated by the local SBA office. The corresponding report from the WRALC office was not available. The third area involved inquiry under the Comprehensive History Interrogation Process (CHIP). For both ALCs visited, we obtained CHIP runs which contained, among other data, records of items which were coded with PMC 3 (purchase from original manufacturer) but which had an Actual Method of Procurement (AMOP) of 1 (competitive). This data, commingled with other data in a rather voluminous report, is being evaluated as part of the Phase 4 effort under this contract. After extracting those items with PMC 3 and AMOP 1, we will locate these items in the ALC Special Procurement History Extract to find



specific data on prices paid under previous noncompetitive purchases. These two data sets will then be compared to develop input data for the economic model to be developed.

We also explored, through data file research and guided interview, the question of cost to breakout for competitive procurement. We were particularly interested in such information as:

- a. Cost of assembling data package.
- b. Cost of first article (inspection and fabrication).
- c. Probability of termination of awarded first time competitive contract.
- d. Cost of termination action.
- e. Probability of additional funds being added to initial award price.
- f. Probability and magnitude of cost of special Inventory Management actions (such as special transshipments due to late deliveries).

This data was obtained from guided discussions with personnel involved in the AFR 57-6 process at the ALCs.

5.13.3 Findings

There is no auditable data which provides a full picture of the costs and savings involved with competitive spares acquisition. A reasonably large amount of data is available which provides contract award prices for the same items under both competitive and noncompetitive award situations. This data will be analyzed as a major part of the Phase 4 effort under this contract. The analysis of this data will need to take into account potential price variation resulting from inflation as well as variation in quantity purchased.



The other cost elements which should be considered in any economic analysis are either not gathered or not readily available for review. The cost of first article preparation is not uniformly treated in proposals submitted. Typical situations may find the cost quoted for the first article to be based on:

1. Average cost for all units including special handling required on the first article.
2. Extra cost associated with first article plus a pro rata share of the nonrecurring cost for the total quantity.
3. Extra cost of the first article plus the total nonrecurring cost for all contract items.
4. Unknown basis reflecting company desire to obtain entry to the market.

The cost for testing first articles (government test) was estimated by the Materiel Management personnel to be \$300 - \$500. We were unable to find any specific data against which this estimate could be evaluated.

No specific data was available concerning termination probabilities or cost. Interviews conducted with the termination contracting office indicated that 73 contracts were terminated for default during the period 1 October 1981 to 1 March 1983. There was no way to identify which of these were first time competitive contracts. It should be noted, however, that 66 of the terminated contracts involved first article requirements. First articles are normally required when a new source is producing an item for the first time. Another difficulty in developing an estimate of the probability of termination is establishing the contract base on which the probability should be based. The Termination Branch was unable to identify the contract base. As an alternative, we can consider comparable length time periods. During the last year, WRALC issued an average of 85 contracts per month containing first article requirements. If we use that as a base we can estimate the termination probability as

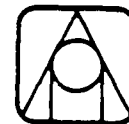


$\frac{66}{(18)(85)} = .04$. In addition, approximately 1 Termination for Convenience case arises each month, on the average, involving contracts containing first article requirements. If we add this to the termination for default data, since convenience terminations often arise from defects in the data packages, we could have an estimate of the upper bound of the probability of termination of $\frac{66+18}{(18)(85)} = .05$.

There had been attempts at WRALC (per the Termination Branch) to collect data on the costs which result from late delivery of items. Due to the many other demands on the time of the Item Manager (IM) and the lack of return to the IM for time spent in gathering the data, no useful data was obtained. It was generally agreed that late delivery often results in cost to the Air Force, but no specific cost data was available.

5.13.4 Implications

While there are substantial amounts of data available on contract prices paid for parts in both competitive and noncompetitive environments, the other costs involved with a breakout to competition are not readily available. This will require follow-up research to support the economic model to be developed under Phase 4 of this contract. Detailed analysis of the price data found in the CHIP and the Special Procurement History Abstract will be accomplished and the findings on average savings compared with the summary of the SBA and Ogden ALC MM data which is being obtained. Inquiry needs to be made, possibly through AFLC Headquarters, to obtain additional data on first article costs and experience on terminations of first article contracts, to support the Phase 4 effort. One of the reasons which was discussed in the guided interviews for the lack of data on many of the costs for accomplishing breakout to competitive purchase involved the issue of value of the data. The perception of the personnel in the field is that competition is an end in itself and needs to be pursued irrespective of the economies of any individual situation. The Congressional and Service emphasis appears, to the worker "in the trenches,"



to be focused on increasing the percentage of items or dollars involved in competitive purchase. Consequently, the cost associated with accomplishing the effort is essentially irrelevant. As a result, efforts to obtain and maintain this data have been minimal.



6. CONCLUSIONS AND RECOMMENDATIONS

6.1 DATA RIGHTS

6.1.1 Provisions are included in contracts which establish a general requirement for the contractor to provide the necessary rights in data to the Air Force. Aggressive action is generally not taken during the system acquisition process to clarify the specific areas for which only limited rights data will be delivered.

Recommendation: AFSC should include in acquisition contracts for new systems DAR Clauses 7-2003.61, Predetermination of Rights in Technical Data, and DAR 7-104.9(b), Notice of Certain Limited Rights, and aggressively pursue resolution of issues involving rights in technical data. This effort could be included in the Integrated Logistics Support Plan.

6.1.2 When the initial PMC is established, the contractor must provide data to support noncompetitive codes. After assignment of the code, this data is returned to the contractor and is not available for the required rescreening of these parts.

Recommendation: Revise MIL-STD-789B and AFR 57-6 to require that the data which supports a noncompetitive PMC be retained by the Air Force as part of the AFR 57-6 file for that part.

6.2 DATA MANAGEMENT

6.2.1 The contracts for acquisition of data for eventual reprocurerment usage generally do not require the contractor to provide data lists as described in MIL-STD-885B. This makes it difficult for the ALC personnel to determine whether all required data has been received or whether a particular data package is complete.



Recommendation: AFLC should take action to identify and implement automation procedures for due-in control, inventory control and retrieval of data in the Repositories.

6.2.5 One of the perceived major impediments to obtaining data for reprourement purposes is the high cost of the data. In our research, we were unable to find specific information concerning costs for technical data for reprourement purposes. Previously reported research indicates that this data should not be expensive.

Recommendation: Contracts which acquire technical data for reprourement should include a separately priced Contract Line Item for this data.

6.2.6 Within the SPO, there is no clear responsibility for ensuring that required data is properly identified, ordered, defined, inspected, accepted and delivered. The responsibility is spread over a number of organizations with no individual assigned responsibility for overall task accomplishment.

Recommendation: Establish a management control system within each SPO to assure closed-loop accomplishment of the above process, with full participation by the ALCs.

6.3 MANAGEMENT PLANNING

6.3.1 The current workforce involved with the AFR 57-6 process has acquired their skills through experience in attempting to perform the AFR 57-6 tasks. They perceive that two areas are impacting the skill level of the workforce.

- 1) Weaknesses in their ability to understand and interpret drawings and other technical data, and
- 2) Recent, substantial turnover in the workforce, introducing people who do not have the requisite experience to discharge their responsibilities effectively.



Recommendation: AFLC should develop a training program which provides the necessary knowledge of the AFR 57-6 process, blueprint reading and technical data evaluation.

6.3.2 The responsibility for the screening of items under AFR 57-6 for breakout and competitive procurement is spread across a number of Directorate of Materiel Management organizations, the Contracting Directorate with support from the Judge Advocate's office and the SBA representative. Within this environment are many competing demands for available personnel resources and travel funds. In addition, none of the ALC personnel interviewed saw any direct relationship between their performance evaluation and the success of the AFR 57-6 process.

Recommendation: AFLC should establish measurable, attainable objectives for each organization involved in the AFR 57-6 process, track progress against these goals, and have performance affect individual and organizational evaluation.

6.3.3 Many of the problems which exist in the AFR 57-6 process have existed for some time, and corrective actions for them are known. A number of these improvements are included in AFR 800-34, "Acquisition Management-Engineering Data Acquisition," April 1983.

Recommendation: Headquarters, USAF should expedite the final signature, printing and distribution of AFR 800-34.

6.3.4 Few of the personnel at the ALCs, either at the working level or the supervisory level, were aware of the contents of AFR 800-34. Many of the actions mandated will require personnel or travel resources to accomplish. Due to constraints on both these resources, the current workforce is not able to accomplish required actions.



Recommendation: AFLC should develop an analysis of the additional personnel and travel resources required to effectively implement AFR 800-34.

6.3.4 When items are identified as being suitable for competitive purchase, it is necessary to identify sources which have the manufacturing capability to build the item. The resident SBA office often provides assistance in this regard, but there is no currently existing system which describes manufacturing capabilities of potential sources.

Recommendation: AFLC, possibly in conjunction with SBA, explore feasibility and value of establishing a data base of quantitative and qualitative descriptors of manufacturing capability for sources who are interested in competing for spares.

6.3.6 During the provisioning process, the contractor and the Air Force identify those support items which are necessary to operate and maintain the system for an initial period of service. The items coded P (procurable) during provisioning become candidates for PMC coding. Information necessary to make these decisions is available during the provisioning process as is information on expected usage rates. Preliminary PMC coding could be established at this time without the necessity for later duplication of the information. Actions required (i.e., completion of final data package) could be identified at this time and plans established for their accomplishment.

Recommendation: AFLC should consider accomplishing PMC coding as an integral part of the provisioning process utilizing the same information base as is used for provisioning.

6.3.7 The earlier specific data requirements can be identified, the more likely it is that data will be successfully obtained. One of the impediments to early identification is the lack of design definition and support concept for the system. An initial estimate of the data requirements could be established if typical spares profiles for various types of weapon systems were available to ALC personnel.



Recommendation: AFLC should examine the feasibility and cost of developing profiles of typical spares requirements for various types of systems and equipments.

6.3.8 Logistics Support Analysis explores the interface of system design and planned operational usage to determine various logistics support requirements. The detailed evaluations accomplished during LSA could provide a viable basis for projecting items for which competitive spares procurement could offer reduced system support cost.

Recommendation: Issue changes to MIL-STD-1388-1 and MIL-STD-1388-2 to require system prime contractors to identify the forecast procurement method of the parts required for maintenance or replacement.

6.3.9 Often data for procurement of spare parts is not received until well into the production phase (delays of 5 to 7 years after production start are not uncommon). During this period, large numbers of spare parts are purchased on a noncompetitive basis and potential savings are not achieved.

Recommendation: AFLC should work closely with the AFSC Program Office to establish data delivery dates early in the production phase, preferably concurrent with the delivery of the initial units of the weapon system.

6.3.10 Where data is already in the ALC Repository with limited rights markings or the data is not available and the contractor refuses to provide it based on an assertion of proprietary rights, there are no defined procedures for determining if the data is, in fact, properly subject to the limited rights legend.



Recommendation: AFLC should develop specific guidance and procedures for determining the validity of proprietary rights asserted on documents within ALC files. For those cases where it is determined that limited rights are all that was acquired the AFR 57-6 file should be documented to avoid expending further efforts on rescreening.

6.4 ECONOMIC ANALYSIS

6.4.1 Economic analysis of items proposed for competitive purchase is greatly hampered by a lack of information on the costs which are likely to accrue to the Air Force in accomplishing the change to competitive status.

Recommendation: AFLC should gather information concerning the costs associated with accomplishing competitive purchase including, but not limited to, cost to fabricate and inspect first articles, cost of acquiring and preparing data package, likelihood and cost impact of termination and late delivery. (This recommendation will be more fully developed in the Phase 4 effort under this contract.)

6.4.2 The basis for the particular costs shown on the AFLC Form 761 is normally not described. The normal case is for a total amount to be shown for the "Total \$ Cost of Breakout," without any explanation of the derivation of this cost.

Recommendation: Revise AFR 57-6 to require that the basis for the development of the "Total \$ Cost of Breakout" be described on the AFLC Form 761.



APPENDICES

- A Procurement Method Codes and
Suffix Codes
- B Definitions
- C Selected Bibliography
- D DoD Publications, Regulations,
Manuals, Pamphlets, and Military
Standards
- E List of Persons Interviewed
- F Teleteach Agenda Topics
- G Protocol for Interviews with DoD,
Air Staff, and AFSC Personnel
- H Ordering Data
- I Contracts Reviewed
- J Contracts Not Available For Review
- K Forms and Categories



PROCUREMENT METHOD CODES AND SUFFIX CODES

Procurement Method Code

Explanation

0	Not established.
1	Items screened and found to be already competitive.
2	Items screened and determined for the first time to be suitable for competitive procurement. A replenishment item will be included in this group only when the identification as PMC 2 is supported by the procurement history of the item. The alternative identification is PMC 1.
3	Items screened and found to be procured directly from the actual manufacturer or vendor, including a prime contractor who is the actual manufacturer.
4	Items screened and determined for the first time to be suitable for direct purchase from the actual manufacturer or vendor rather than the original prime contractor for the end items which these parts support. A replenishment item will be included in this group only when the identification as PMC 4 is supported by the procurement history record of the item. The alternative identification is PMC 3.
5	Items screened and determined not suitable for competitive procurement or direct purchase and which, therefore, continue to be procured from a prime contractor who is not the actual manufacturer.

Procurement Method Suffix Code

Explanation

O	Not established.
A	Government's rights in data questionable.
B	Source control.
C	Procurement from approved source.
D	The data not available.
E	Status can be improved.
F	This item is in phased provisioning.
G	Data is technically suitable and legally clear.
H	Inadequate data.

**Procurement
Method
Suffix Code**

Explanation

J	Restricted to the prime contractor.
K	Produced from class 1A castings.
L	Low dollar value of procurement.
M	Master or coordinated tooling.
N	Requires special test.
P	Rights to use data legally unavailable.
Q	Requires exceptional unique manufacturing processes.
R	Rights to use data restricted.
S	Security classification.
T	Qualified Products List (QPL).
U	This item is uneconomical to compete.
V	High reliability part.
W	Parts may be procured by the method indicated by the procurement method code if military or adopted industry specifications are substituted for the contractor's data which are subject to the government's limited rights of use.
Y	Design unstable.
Z	Necessary to ensure standardization and interchangeability.

DEFINITIONS*

Authorized Data List (ADL) -- A master list of Data Item Descriptions from which technical data requirements must be selected for contractual application.

Contract Data Requirements List (CDRL) -- A contract form, DD Form 1423, listing all technical data items selected from an ADL required to be delivered under the contract.

Data Call -- A request by the System/Project Manager, Commander or other authority to all Government participants to submit their requirements for contractor-prepared data on a given procurement action.

Data Item Description (DD Form 1664) -- A form which specifies the data required to be furnished. The forms specifically define, using the descriptive method, the content, preparation instructions, format and intended use of each data product.

Data Package -- A collection of data products (items) which is complete for a specific use.

Data Price -- The price associated with preparing and delivering a technical data item to the Government.

Data Repository -- A DoD organizational entity, component, or a specifically designated contract facility which is responsible for indexing, storing, retrieving and distributing technical data.

Deferred Delivery -- A situation in which the contract specifies the technical data to be delivered but does not schedule a delivery date.

Deferred Ordering -- Delaying the ordering of the data until the need is economically determined.

Deferred Requisitioning -- A situation wherein the contract specifies the format, range, and kinds of data that the contractor is obligated to deliver when requisitioned by the Government, and prescribes the ordering conditions and pricing terms. It contemplates retention of masters and copies by the contractor and delivery of copies of individual drawings (or other items of data) as needs arise.

*Source: DoD Instruction 5010.12,
"Management of Technical Data," 5 Dec 1968.

Deliverable Technical Data -- Technical Data (listed on the Contract Data Requirements List) required to be delivered under terms of the contract.

Delivery of Technical Data -- The transfer of technical data from the contractor/DoD component to the activity designated in the contract.

Ordering of Data -- The identification in a contract of the technical data which the contractor shall be obligated to deliver under the contract.

Technical Data -- Technical data are recorded information used to define a design and to produce, support, maintain or operate items of defense materiel. These data may be recorded as graphic or pictorial delineations in media such as drawings or photographs; text in specifications or related performance or design type documents; in machine forms such as punched cards, magnetic tape, computer memory printouts; or may be retained in computer memory. Examples of recorded information include engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information.

Technical Data Management -- The discipline which embraces the identification, coordination, collation, validation, integration, and control of data requirements; planning for the timely and economical acquisition of data; insuring the adequacy of acquired data for their intended use; and management of data assets after receipt. This discipline also includes supervision of the distribution of data acquired under contract and monitoring storage, retrieval and disposal of these data.

Technical Data Management Office -- The organizational element at any level of a DoD component which serves as a data management central focal point and provides advice and assistance directly to the head of the component in the implementation of this instruction and related implementing directives.

Technical Data Management Officer -- An individual designated by a responsible authority (Commander, System/Project Manager, Plant Representative, Director or other authority) to assist and advise in applying data management disciplines within the area of responsibility of the appointing authority.

Technical Data Requirements Review Board -- A Board, comprised of representatives from those functional or organizational units which have data requirements, and appointed by a responsible authority (System/Project Manager, Commander or other authority) to review the Contract Data Requirements List and assist and advise in the management of technical data.

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US AIR FORCE ACQUISITION LOGISTICS DIVISION (AFLC)

Lessons Learned

01255	Provisioning Policy, Methodology, Negotiation
02555	Source Data Package
02845	Configuration Management - Specification Files
02965	Technical Data Management
02995	Technical Data Management
03005	Contractor Reprocurement Drawings
03365	Component Breakout Selection Process
04445	Management of Engineering Data
07405	Proprietary Processes
08095	Control of Contractor Drawing Practices
09565	In-Process Reviews of Engineering Data (ED)
10725	Leader/Follower Contracting
11645	Direct Procurement by ALCs
12115	Provisioning Funds for Breakout

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Mr. H. Brown (PMDOT)
Mr. S. Buchen (PMDOT)

Mr. E. Carr (MMMR)
Mr. C. Carter (MMRRA)
Mr. R. Forney (MMMP)
Mr. G. Hampton (MMMRF)
Mr. B. Harrison (PMC)
Mr. T.C. Hollingsworth (SBA)
Mr. H. Kyte (MMIRE)
Mr. G. Lipford (MMEDD)
Ms. L. Nix (MMEDD)
Ms. L. Purser (MMEDDA)
Mr. R. Snyder (PMXD)
Mr. J. Stanley (MMIRB)
Col L. Steinmetz (CR)(Competition Advocate)
Mr. H. Tucker (MMII)
Mr. W. Vincent (PMZAA)
Mr. W. Walker (JA)
Mr. R. Walters (PMD)
Mr. H. Ward (PMD)
Mr. J. Weeks (MMEDDA)
Mr. W. Wilson (PM Deputy, F-15)

- k. Other Air Logistics Centers:
Competition Advocates, System Managers, and Data
Managers, using the Air Force Institute of
Technology's Teleteach System.
- l. Defense Audit Service (DAS):
Mr. J. Helfrich
- m. Air Force Audit Service (currently at AFPRO, General Electric
Co., Evandale, Ohio):
Mr. R. Kestner

27 October 1982

TELETEACH AGENDA TOPICS

1. Names and positions of participants.
 2. What do you actually do as:
 - Competition advocate?
 - AFR 57-6 monitor?
 - Other position?
 3. Where do you get data to do your analysis?
 - Supply control studies?
 - Contract data files?
 - Contract clauses review?
 - Other?
 4. a. Who supplies data for:
 - IMSS-11-Quarterly Report-Procurement Method/Procurement Method Suffix Codes-RCS: DLA(Q)1739-11(5).
 - BZ82ASS-Monthly 57-6 Report (Mismatch Report).
 - Spare Parts Procurement Reporting System (DD-I&L(Q)714.

b. Where does the data actually come from? Is it accurate?
 5. a. What rewards/penalties exist for increasing competition?

b. Is it an element in performance standards/merit pay standards?
 6. Each ALC's Competition Advocate is given FY83 Competition Goals by letter (AFLC LOR letter, subject: FY83 Competition Goals, 19 July 1982).
- | | |
|-----------|---------------|
| OC: 29.7% | |
| OO: 35.3% | 2750th: 44.4% |
| SA: 28.2% | AGMC: 71.4% |
| SM: 34.8% | AFALD: 84.6% |
| WR: 28.4% | |
- a. Where did these goals come from?
 - b. Are they realistic and attainable?
 - c. Who supplies the data? Where does it come from? Manual? Mechanical?
 - d. At what level of command is this information reviewed? How often?

AF-1

APPENDIX F

7. What are the real factors inhibiting increased competition? Are they real or myths which have been institutionalized?
8. As competition advocate or 57-6 monitor, etc., what is the percentage of your position description/actual time spent on this subject? Does anyone assist you directly?
9. Specific questions for discussion include:
 - a. Does the use of certain PMC Suffix Codes predominate? If so, does that provide an indicator of where to focus primary attention?
 - b. Is there clear guidance for the decision on ownership of data rights, including procedures and contract clauses?
 - c. Is there a firm basis for establishing quality and acceptability requirements for data packages?
 - d. Are procedures for updating data packages adequate to ensure currency? Are they being followed?
 - e. Is there an adequate basis for the economic analysis of proposed breakouts?
 - f. Are there quantitative and qualitative skill shortfalls? (Do we have enough of the right kind of people?)
 - g. Have the early phase efforts necessary to establish competitive spares procurement been defined? Are they being followed?
 - h. Do problems of motivation (either contractor or government) impact successful execution of competitive spares procurement?
 - i. Are there differences in philosophy for large volume versus small volume procurements?
 - j. Do certain systems, commodities, or political considerations unduly influence the statistics? (Fuels, TRIDENT, socio-economic programs, etc?)

1 Nov 82

PROTOCOL FOR INTERVIEWS WITH
DOD, AIR STAFF, AND AFSC PERSONNEL

1. What changes to current policies, directives, regulations, or procedures are underway or under consideration?
2. Where are the pressures emanating from with respect to increasing competition?
3. What changes in the DAR(FAR) are needed/being implemented to provide for increased competition?
4. How is the alleged conflict between competitive procurement and socio-economics programs being addressed? (Small business, minority-owned business, women-owned business, prison industries, Walsh-Healy Act, etc.)
5. Assuming that current policies, directives, regulations, procedures, etc. are adequate, what are the real or perceived impediments to increasing competition for spares?
6. What is the real objective of increasing competition? Reduced unit price? Reduce total cost? Expanding industrial base? Other? Are we willing to pay the price?
7. What is the position on off-shore procurement?
 - a) Spares?
 - b) Strategic materials?
 - c) Quality assurance?
8. Data seems to be a prime factor. Is there a disconnect between the organizations who buy the data and those who want to use it?
9. What motivators are provided to incentivize people to increase competition? What accountability exists? Is there a closed loop?
10. Are we really over-specifying our requirements? Are MIL-STNDS, etc. too restrictive to permit real competition? Who says? Who decides?
11. At what level are competition objectives reviewed? How often? What is the feedback and control mechanism?

AG-1

APPENDIX G

12. Reports indicate that we (try to) use 2-3% of the data that we buy. How much data is enough? Who decides and when do they decide? Should we price data early and consider deferred ordering/delivery?
13. Do the government legal people have the resources and motivation to support data rights disagreements, both at the front-end or in litigation to protect the government's interests?
14. Is there clear guidance for the decision on ownership of data rights, including procedures and contract clauses?
15. How is quality being addressed? How is quality specified? Up front? DCAS, AFPRO, acceptance testing? Failure analysis? Does increased competition make the problem more difficult? How is this being addressed? Should we buy to industry standards?
16. Are competition objectives being established in performance standards and merit pay standards? How can you reward/penalize an item manager/buyer when the decisions on data requirements, acceptance, and validity are determined by somebody else?
17. How do we discriminate between "real" competition and "phony" competition? (A manufacturer sets up small business distributors/vendors, etc.)
18. How far should we pursue the Commercial Item Support program, etc. for items that are not truly commercial or off-the-shelf items? Are there real economies in centralized procurement/storage/distribution?
19. Can/should we go to the I.D.T.C./schedule arrangement such as used by GSA? Are contractors willing to bet "on the come" and hold inventories for us?
20. Contractors' strategies are motivated by economics (interest rates, expectations, return on investment, return on equity, etc.). Is the government willing to make commitments or put money up-front to increase the competitive base?
21. One solution is to increase resources. But every activity proposes that solution. Does decentralized management authority/responsibility dilute these efforts?
22. Is the government able to staff/pay enough of the right kind of people to do the job? Should we change the mix of engineers/technicians?

23. Is the government willing and able to resource the data purchase/storage/retrieval assets to do the job? If so, what will suffer?
24. Is there a firm basis for establishing quality and acceptability requirements for data packages?
25. Is there an adequate basis for the economic analysis of proposed breakouts?
26. If you could change anything, what would you do?

ORDERING DATA

The below listed ordering data are required IAW paragraph 6.2.1 of DoD-D-1000B and AM 1 dated 30 November 1978.

- A. Drawings, Engineering, and Associated Lists, DoD-D-1000B, dated 28 October 1977.
- B. Level 3.
- C. Contractor design activity identifier.
- D. Contractor design activity drawing numbers.
- E. Not applicable.
- F. DI-E-7031 is applicable.
- G. Not applicable.
- H. Not applicable.
- I. Acceptable, if not covered by U.S. Government Standards or nationally recognized U.S. Industry Association Specification or Standards.
- J. Parts Lists and Data Lists.
- K. Data Lists at subunit level, Parts Lists at assembly level.
- L. Mono or multi detail for single application are acceptable.
- M. Not applicable.
- N. Control drawings IAW DoD-STD-100C shall be prepared. Criteria shall be as specified in DoD-D-1000B.
- O. Optional.
- P. As applicable.
- Q. See paragraph U.
- R. 35mm roll microfilm or aperture cards are required.
- S. If necessary to support usage, undimensioned drawings are required.
- T. Not applicable.

- U. Data prepared shall include all new and revised data reflecting the configuration produced under this contract. This data shall include complete design, fabrication, and verification data necessary to fabricate and test hardware identical to that produced under this contract and not previously furnished the government. Applicable input/output parameters shall be reflected on each electrical component considered a procurable spare part. Information contained in these drawings shall be adequate to fabricate and test without recourse to special test equipment/facilities to the maximum extent practicable.

One each blue-line copy of applicable data shall be delivered to the Air Force for technical evaluation and approval prior to submission to DCASO in microfilm form. Schedule for review and delivery is as follows:

Ship to: WR-ALC/MMEDDA
Bldg 301 Station 34
Robins AFB, Georgia 31098
_____ days prior/after delivery of 1st
production item. Review shall be completed
within 60 days after receipt of date.

Undimensioned drawings mailed to Warner Robins ALC/MMEDDA, Robins AFB, GA 31098, concurrent with delivery of microfilm.

35mm microfilm or aperture cards are required to be delivered 60 days after approval of blue-lines by the Air Force. Mailed to: AFALD/PTD, WPAFB, OH 45433.

One each copy of an Alpha-numeric Index of applicable documents shall be furnished. Index shall reflect the current revision level of the documents and quantity of outstanding engineering change orders. Index may be prepared in contractor's existing format and shall be furnished in hard copy only. Delivery of the Index shall be made to WR-ALC/MMEDDA concurrent with first submittal of microfilm to AFALD/PTD.

One information copy of DD 250 and shipping list is required to be mailed to WR-ALC/MMEDDA concurrent with delivery of 35mm microfilm to AFALD/PTD.

NOTE: Shipments of microfilm data to AFALD/PTD shall contain a shipping list prepared in accordance with paragraph 5.3, MIL-D-5480 except that part number (noun) and drawing size shall be optional. The shipping list shall specify whether the shipment is partial, incremental, update, final or make-up (corrected) as appropriate.

CONTRACTS REVIEWED

Contract Number	Date Issued	System	Buying Agency	Dollar Value*	Predetermination of Rights	Notice of Certain Limited Rights	Rights in Technical Date	Deferred Delivery of Technical Data	Deferred Ordering of Technical Data	Warranty of Technical Data	Separate Technical Data Pricing	DOD-STD-100
F33657-76-C-0034	07/31/75	A-10	ASD	4.6m			X					X
F33657-78-C-0135	11/01/78	A-10	ASD	413.5m		X	X		X	X	X	X
F33657-79-C-0502	10/08/79	A-10	ASD	485.9m		X	X		X	X	X	X
F33657-81-C-2047	03/01/81	MAVERICK Test Set	ASD	1.27m			X	X	X	X	X	X
F33657-75-C-0006	08/29/75	MAVERICK A/B	ASD	17.4m			X		X			X
F33657-76-C-0025	10/17/75	MAVERICK B and Training Missile	ASD	5.0m			X		X			X
F33657-78-C-0468	10/02/78	IR MAVERICK	ASD	90.2m			X	X	X		X	X
F33657-68-C-0829	07/06/68	MAVERICK TPP	ASD	94.5m			X	X	X			X
F33657-75-C-0550	06/18/76	Laser MAVERICK	ASD	6.38m		X	X		X		X	X
F33657-75-C-0458	03/25/75	MAVERICK Laser Seeker	ASD	2.56m		X	X		X		X	X
F33657-77-C-0467	08/31/77	MAVERICK Warhead	ASD	13.1m			X		X			X
F33657-70-C-0300	01/01/70	F-15	ASD	1215m			X		X		X	X
F33657-76-C-0100	07/01/75	F-15	ASD	991m			X		X		X	X
F33657-77-C-0200	03/01/77	F-15	ASD	790m			X		X		X	X
F33657-79-C-0779	07/17/79	F-15	ASD	807.1m			X		X		X	X

* Basic Contract

CONTRACTS REVIEWED (cont'd)

Contract Number	Date Issued*	System	Buying Agency	Dollar Value*	Predetermination of Rights	Notice of Certain Limited Rights	Rights in Technical Date	Deferred Delivery of Technical Data	Deferred Ordering of Technical Data	Warranty of Technical Data	Separate Technical Data Pricing	DOD-STD-100
F33657-73-C-0701	05/01/73	F-15 Simulator	ASD	7.84			X		X		X	X
F33657-79-C-0788	12/15/79	F-15 Simulator	ASD	20.6			X	X	X		X	X
F33657-77-C-0559	07/14/77	F-15 Radar	ASD	38.2			X				X	X
F33657-78-C-0055	10/01/77	F-15 C/M Sets	ASD	32.7m			X				X	X
F33657-80-C-0002	10/02/79	F-15 C/M Sets	ASD	50.3m			X	X	X	X		X
F33657-79-C-0760	12/01/79	F-15 EW Set	ASD	3.67m			X	X			X	X
F33657-77-C-0585	08/18/77	F-15 EW Set	ASD	4.7m			X		X			X
F33657-76-C-0507	05/05/76	F-15 C/M Sets	ASD	2.1m			X	X				X
F33657-75-C-0310	01/13/75	F-16 A/C	ASD	10m(w/option)			X		X			X
F33657-80-C-0003	11/01/79	F-16 LLT, Spt Equip	ASD	90m								
F33657-81-C-0215	10/02/81	B1-B Defense Avionics	ASD	143m			X		X			X
F33657-81-C-0212	10/12/81	B1-B Offense Avionics	ASD	436m		X	X		X			X
F33657-80-C-0059	04/25/80	SRAM Rocket Motors	ASD	11.3			X		X		X	X
F33657-79-C-0068	10/23/78	EF-111A Jammer	ASD	131.5			X		X		X	X
F33657-78-C-0055	10/01/77	AN/ALQ 135V	ASD	32.7			X					X

*Basic Contract

Contract Number	Date Issued
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***Basic Contract**

CONTRACTS NOT AVAILABLE FOR REVIEW

Contract Number	Date Issued	System	Buying Agency	Dollar Value	Predetermination of Rights	Notice of Certain Limited Rights	Rights in Technical Date	Deferred Delivery of Technical Data	Deferred Ordering of Technical Data	Warranty of Technical Data	Separate Technical Data Pricing	DOD-STD-100
F33657-75-C-0745		MAVERICK SR Launcher										
F33657-79-C-0824		MAVERICK Spt Contract										
F33657-73-C-0500		A-10										
F33657-78-C-0669		F-16										
F33657-79-C-0780		F-15										
F33657-78-C-0527		F-15 Peace Eagle										
F33657-77-C-0559		F-15 RWR										
F33657-77-C-0585		F-15 EWMS										
F33657-76-C-0464		F-15 Peace Fox I										
F33657-76-C-0506		F-15 Peace Fox I										
F33657-76-C-0507		F-15 Peace Fox I										
F33657-79-C-0479		F-15 Peace Sim ICS										
F33657-81-C-0210		B1-B Airframe										
F33657-81-C-0208		B1-B Airframe										
F33657-81-C-0213		B1-B Off Avionics										
F33657-81-C-0214		B1-B Def Avionics										

FORMS AND CATEGORIES
(MIL-D-1000, DRAWINGS, ENGINEERING AND
ASSOCIATED LISTS, 1 MARCH 1965)

Intended use categories:

- Category A - Design Evaluation
- Category B - Interface Control
- Category C - Service Test
- Category D - Logistic Support
- Category E - Procurement (Identical Items)
- Category F - Procurement (Interchangeable Items)
- Category G - Installation
- Category H - Maintenance
- Category I - Government Manufacture
- Category J - Interchangeability Control

Forms of Drawings:

- Form 1 - Drawings to Military Standards
- Form 2 - Drawings to Industry Standards
(Partial Military Controls)
- Form 3 - Drawings to Industry Standards
(Minimum Military Controls)

LEVELS
(DOD-D-1000B, DRAWINGS, ENGINEERING AND
ASSOCIATED LISTS, 28 OCTOBER 1977)

Level 1, Conceptual and Developmental Design

Conceptual Design

To verify preliminary design and engineering and confirm that the technology is feasible and the design concept has utility against stated military requirements in order to reduce technical uncertainty.

Developmental Design

Developmental design is directed toward hardware, for test or experimentation and provide for a specific design approach. In addition, the data shall be suitable for analytical evaluation of the inherent ability of the design to attain the required performance.

Level 2, Production Prototype and Limited Production

Designs that approach the final form factor, employ standard parts (or non-standard parts approved by the agency concerned), take into consideration full military requirements with respect to performance, and can support limited production of models in final form and suitable for field test, deployment and logistic support.

Level 3, Production

To provide engineering data for support of quantity production to permit competitive procurement for items substantially identical to original items. These engineering drawings reflect technical data possessing the highest level of confidence.

END

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